DOCUMENT RESUME

ED 470 289 TM 034 509

AUTHOR	Quinn, David W.; Quinn, Nancy W.
TITLE	PLATO Use for Graduation Test Preparation, Piedmont High School, Piedmont, Alabama. PLATO Evaluation Series.
INSTITUTION	PLATO Learning, Inc., Bloomington, MN.
PUB DATE	2002-02-00
NOTE	44p.
PUB TYPE	Reports - Evaluative (142)
EDRS PRICE	EDRS Price MF01/PC02 Plus Postage.
DESCRIPTORS	Computer Software; *Graduation Requirements; *High School Students; High Schools; *Test Coaching
IDENTIFIERS	*Alabama High School Graduation Examination

ABSTRACT

Piedmont High School is a small high school in rural Alabama, which serves a primarily white population and has a high dropout rate. PLATO computerized instruction has been used by almost 200 skill-deficient students, and 4 teachers have used it. After using PLATO, Piedmont's struggling students are much more likely to pass the Alabama High School Graduation Examination (AHSGE). The eventual passing rates for students using PLATO are somewhat lower than those of other PHS students, but the growth that PLATO learners exhibit surpasses that of non-PLATO students. PLATO users make the greatest gains in mathematics (a 19% increase in passing) and language arts (a 15% increase in passing). Overall effect size was 0.64 in reading, language arts, and mathematics, and 0.26 in science. When the percent of activities mastered was considered, passing students had a higher percentage of mastering activities, indicating that mastery of PLATO modules is a predictor of success. Overall, however, from 39% to 49% of the activities studied were mastered by PLATO students whether they passed or failed an AHSGE subtest. PLATO educators said that they are generally pleased with the instructional and technological aspects of PLATO and their own training. (SLD)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 470 289

PLATO®

Evaluation Series

PLATO Use for Graduation Test Preparation,
Piedmont High School, Piedmont, Alabama

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

W.R. Foshay

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Evaluation Prepared by:

Nancy W. Quinn, M. S.
David W. Quinn, Ed. D.

Series Editor:

Rob Foshay, Ph. D.
Vice President,
Instructional Design and Cognitive Learning
rfoshay@plato.com

PLATO Learning, Inc.
10801 Nesbitt Avenue South
Bloomington, MN 55437
USA
http://www.plato.com

February, 2002

TM034509

BEST COPY AVAILABLE

Executive Summary

Piedmont High School (PHS) is a small, four-year school in rural Alabama; it serves a primarily white population and has a high dropout rate. In order to bolster graduation numbers, Principal Matt Akin has directed PLATO use by almost 200 skill-deficient students; four teachers have used it also. Mr. Akin purchased Package VII and Cyber Ed for the Biology component; the Science upgrade was recently installed. Reading has not been updated because of cost and lower compatibility with the state standardized exam.

PLATO has been used at PHS for two calendar years, for the most part as a supplementary program. Most students are invited or required to use PLATO when they have failed one or more subtests of the required Alabama High School Graduation Exam (AHSGE); a few are given the program for credit completion on a flexible schedule. Students are assigned individually to activities, according to staff perceptions of their needs. One-half of the students were assigned to math, one-third to language arts, one-tenth to reading, and a few to the old science program. A few students at a time work individually on the system during the day, before or after school, during school breaks and summer school; the students may or may not have instructional help from a teacher while using PLATO. In most classes, it appears that students were not required to master the modules they studied, before going on.

Comparison of PLATO Students. After using PLATO, Piedmont's struggling students are much more likely to pass the AHSGE. The eventual passing rates for PLATO students on the AHSGE are somewhat lower than those of the other PHS students. However, the growth that PLATO learners exhibit surpasses that of non-PLATO students; PLATO users make the greatest gains in math (19% increase in passing) and language arts (15% increase). Overall effect size was .64 in reading, language arts and math (moderately large), and .26 in science.

When the *percent* of activities mastered were compared, passing students had a higher percentage of mastering activities, indicating that mastery of PLATO modules is a predictor of success. Overall, however, from 39% to 49% of the activities studied were mastered by PLATO students whether they passed or failed an AHSGE subtest. PLATO students who passed AHSGE subtests completed fewer PLATO modules than did those who failed subtests, perhaps because they had fewer learning deficits and therefore started fewer activities.

PLATO educators said that they are generally pleased with the instructional and technological aspects of PLATO and their own training. Most student respondents were also positive: they could navigate through the program, felt they were getting what they needed, and were involved. Those who were not positive had a variety of issues to report.

Discussion. The performance of PLATO at PHS is positive in light of student selection criteria, limited computer access, and modest instructional support. Findings from the site study suggest that PLATO students should be required to master the activities to which they are assigned, and that low achievers are likely to need additional personal instruction. The PHS story demonstrates the power and influence of a principal who acts as an instructional leader in implementing the PLATO system.

Table of Contents

Executive Summary 2
Introduction 4
Program Description 5
- The School. 5
- The Students. 5
- PLATO Use at Piedmont. 6
- Technology. 7
- Software Selection. 7
- Support of PLATO. 8
- Teacher Preparation. 8
- Student Placement in PLATO. 8
- Student Computer Use. 9
- Monitoring Student Achievement. 10
- Encouraging Student Performance. 10
- Learning Materials. 11
- PLATO Problems and Suggestions. 11

Data Analysis 12
- PLATO Use and Test Score Findings 13
  - PLATO Use. 13
  - Test Score Findings. 15
  - Relating PLATO Use to AHSGE Test Scores. 18
- Instructor's Survey Responses 20
  - PLATO Content. 20
  - Instructional Issues. 22
  - Technical Issues. 23
  - Teacher Affect. 25
  - PLATO Student Usability. 26
  - Integration into Other Instruction. 28
  - Open-Ended Questions. 29
- Learner's Survey Responses 29
  - Ease of Use. 30
  - Student-Appropriate Content. 31
  - Student Attitudes toward PLATO. 33
  - Helpfulness of Topics. 34
  - PLATO Learner's Survey Comments. 36

Discussion 37
Appendix: Teacher and Student Survey Open-ended Responses 40
About the Authors 43

Piedmont High School

Introduction

Piedmont, Alabama—population 4,900—is located in a scenic, rural area of the northeastern part of the state. The city is in Calhoun County, approximately 85 miles northeast of Birmingham and west of Atlanta, Georgia. Piedmont City School System serves a total of 1,100 students, and 325 of those students attend Piedmont High School.

Piedmont District has an avid interest in improving its state report card and SAT-9 scores, while cutting costs. A recent news release states that the small size of Piedmont System puts it (along with four other districts) at risk for consolidation because of recent budget cuts in the state. District leaders are unhappy with this threat, particularly since they have not borrowed money from the state. Prior to this announcement, U.S. Rep. Bob Riley pointed to the digital divide and the economics of Congressional District 3, and obtained nearly a million federal dollars for last year to be used on technology. The Piedmont System did not receive technology funds last year, but for 2000-2001 they have received $44,000 for computer needs. Some of these federal funds have been combined with state "At-Risk" moneys and other sources into a grant called Students, Technology and Raising Standards (STARS). Piedmont High School received a STARS grant, which was used in the fall of 2001 to purchase 20 laptops for low-skilled students.

At this writing, PLATO has been in use at Piedmont High School for two years, having been installed and fully operational by January 2000. Since that beginning date, Mr. Akin reports that approximately 200 students have used the system for some amount of supplementary or primary instruction. Most students have been assigned to the program because they have failed either a subtest of the state graduation exam or a class. A few students have used PLATO because of teacher recommendations regarding low academic skills or to complete a course they had started elsewhere.

The driving force behind PLATO use at Piedmont is Principal Matt Akin. He was one of the decision makers who purchased the program, and since then he has taken primary responsibility for selecting, enrolling, and monitoring PLATO students. This evaluation is doubly of interest to Mr. Akin because he is working on a doctoral dissertation in technology and is using Piedmont student data for his study. He has expressed a specific interest in the possibility of correlation between student PLATO scores, scores on the state proficiency exam, and time spent using PLATO. PHS also uses an old CAI algebra program and a limited amount of other non-PLATO software.

Data for this evaluation was collected from Mr. Akin, the four teachers who use PLATO at Piedmont, and students. Mr. Akin provided information through correspondence, phone interviews, and the Instructor's PLATO Evaluation form that he completed. The four teachers likewise completed the instructor's evaluation, and two of them were interviewed by phone. Further information about Piedmont PLATO students was obtained from three sources: PLATO student surveys, PLATO system reports, and

standardized test results. Standardized test results come from the Alabama High School Graduation Exam (AHSGE), which all students are required to pass in order to graduate.

The following report first describes PLATO use at Piedmont High School. Following the program description, the data section presents various evaluation activities and their results as follows:

- Student use data and outcome findings
- Instructor interviews and survey findings
- Learner survey findings

Finally, the Discussion section brings together major issues from the report overall. The Appendix following the report gives transcribed comments from teachers and learners.

Program Description

The School.

Piedmont High School serves approximately 325 students in 9th through 12th grades. The average classroom size is 25 students, with a maximum of 29. There are 24 teachers, 19 of whom are full time. In the building there are 24 classrooms, two computer labs, and two areas used as labs—the school library and a conference area that adjoins the principal's office. The school operates on a modified calendar, with classes being held for 9 week terms, interspersed with two-week breaks. The school day is divided into 90 minute blocks and 45 minute half-blocks (or "skinnies") for remedial/special education classes and non-academic classes like physical education.

The Students.

Most Piedmont students are white (86%); the remainder are black (13%) and Hispanic, Asian, or Other (total of 1%). One-third of the students receive free and reduced lunch, which is somewhat high for a high school. Reading is a particular problem for many students, but scores indicate a wide range of abilities. One instructor estimated that 70% of the students have computers at home. Parents attend PTA meetings and student conferences "as much as they do in any high school—25 to 30%."

The roster of PLATO student names, combined with AHSGE test results, indicates that at least twelve PLATO students had Specific Learning Disabilities (SLD). There were two students in each of the remaining categories, with no dual-designations: Mentally Retarded (MR); Visually Impaired (VI), Emotionally Disabled (ED), Other Health Impairments (OHI), or Gifted and Talented (GT).

The drop-out rate for PHS has been high: two years ago, one of every four students (25%) left school without graduating. However, in the last school year (2000-2001) only 15% dropped out. While this is still not a desirable number for them, Mr. Akin says that it is marked improvement and they are pleased with it, especially since that number puts them in range of accreditation. He feels that PLATO has not helped reduce the dropout rate, but he says that he thinks it could if properly used by them.

PLATO Use at Piedmont.

PHS students have used PLATO as part of their regular schedule, on a pull-out basis, before or after school, on special days during the two-week breaks, or during summer school. During the regular school year, a few students work daily on PLATO; others may be pulled out of an elective, such as physical education, or are encouraged to come before or after school or any other time that they can. During the fall of 2001, eight or ten students were regular users of PLATO in the conference room, and a few others floated in and out. Four of these students were doing Independent Study, i.e., working on a prescribed course for credit because they had failed a course or were transfer students and school offerings did not accommodate their schedules. Formally, they may have been enrolled in a regular remedial class. All of these particular students used computers in the conference room, and they often (but not always) had assistance from a tutor or from Mr. Akin or another administrator. (A tutor who helps with PLATO may be a volunteer, parent, or student from Jacksonville State University—which is just 12 miles away.) In addition, during the two-week fall break, 15 or 20 students worked on PLATO for three back-to-back days.

During summer school of 2001, 20 remedial students worked on computer software in Computer Lab 1. Fifteen of the students had failed Algebra I and they worked on older computers with CAI software more than ten-year-old. The remaining five students worked on newer PLATO computers that were brought into Lab 1 from the conference room. PLATO learners were assigned to a specific computer; they signed in each day under their own names and chose the activities they wanted to do each day. All students worked five days a week, from 8:00 a.m. to 1:00 p.m., with two ten-minute breaks. Summer school students therefore had 25 days of instruction, five hours a day, for a total potential maximum of 125 hours of instruction.

Two of the summer school PLATO students could breeze through their assigned modules and they often tested out by passing mastery tests; the other three needed to do every part of their modules. The teacher sat with struggling PLATO students as much as he could, watching them work through modules and answering questions for them. When the teacher was busy, PLATO students were allowed to help each other for a few minutes, so that those with questions could continue with their work. There was more enthusiasm among the learners because of the helpful interactions. Students also worked together outside of class, although not on PLATO.

Along with Mr. Akin, four teachers use PLATO for tutoring to some extent, usually to develop skills for the graduation exam. One teacher said that she does not use PLATO in her classroom, but sends students to the library or conference room (to work on PLATO) during their free periods for two or three weeks before the AHSGE is given. She is also responsible for some PLATO students who are registered for her remedial classes, but who work with computers (and textbooks) to complete other topics or courses. The other teacher who was interviewed does not use PLATO much during the regular school year; he works with students on the program during summer school.

In terms of the instructional models described in PLATO Technical Paper #6 (Foshay, 2000), it thus appears that most use of PLATO exemplifies the supplementary instructional model. The summer school program and some credit-completion work exemplify the primary instruction model.

Technology.

In all, Piedmont HS has approximately 80 computers that could provide PLATO, but most of them are not easily accessible. This equipment is located throughout the building in several configurations: two computer labs, a conference room area next to the principal's office, the library, and individual computers for teachers. Lab 1 has about 25 old Apple computers dedicated to an old non-PLATO program for 9th graders who need Algebra I. Lab 2 has approximately 20 Dell computers with 32 K of RAM, 128 megabytes of storage, and Windows 95. This lab is used primarily for computer education classes—keyboarding and word processing—but it is available for the third hour of the day for other uses. The conference room has eight to ten computers that are used exclusively for tutoring with PLATO. The school library has six computers that are used occasionally for PLATO. Throughout the school, teachers have been given a laptop for their own use, and some have another computer or two in their classrooms as well; however, PLATO is seldom used on most of these classroom machines.

Piedmont is interested in getting more classroom computers; local businesses have donated a few, but funds for purchase are limited due to several factors. One such factor is its small enrollment, since money is allocated on a per-pupil basis. Another issue is the fact that Alabama has had budget cutbacks for education and Piedmont has had to weigh all expenditures with special care, including heat for buildings. Most recently, as mentioned earlier, the local school system has been threatened with consolidation as a state cost-cutting measure. However, some help is on the way in the form of federal and state technology grants.

As of the current school year, a Students, Technology and Raising Standards (STARS) grant for at-risk 9th graders will provide one class of Piedmont 9th grade students (20 in number) with laptop computers to use throughout their school day. These students, who will be together throughout the school day, will be able to use PLATO when they are in English. As of November, 2001 wireless connections were problematic, but there is hope that when the vendor (not PLATO Learning, Inc.) has corrected the situation, access to PLATO will be very helpful to those who need it most.

Software Selection.

Mr. Akin wears two hats in his district; he has been Technology Director for the school system in prior years, and has retained that position since becoming principal at the high school. As Director, Mr. Akin secured funds to purchase software and then participated in the selection of PLATO. The choice of PLATO was made by a small group of educators: (1) Mr. Akin, (2) the former PHS principal, and (3) the curriculum coordinator in the district. All three had looked at PLATO and other programs previously, but they inspected PLATO again while making their final decision. Overall, Mr. Akin says, "PLATO does the best instruction of any program I have seen. PLATO offers more in-

depth teaching and is better at teaching skills than other programs...Its report capability is one of its beauties."

Initially, Mr. Akin purchased Package VII and Cyber Ed for the Biology component. The Science upgrade was purchased for use beginning Fall, 2001, but hard drive upgrades were necessary before installation could be completed. (The required upgrades may be helpful all around: One of the teachers said that computers at the school freeze about once a day and must be shut down, and that when these interruptions happen, students lose some work. Perhaps the upgrades will end those problems.) Reading has not been updated because of cost and lower compatibility with the state standardized exam.

Support of PLATO.

Mr. Akin has an assistant who handles software problems or needs; if something unusual is needed, either one of them may call the PLATO support line. The school system takes care of any hardware problems. When students are using PLATO, they often (but not always) have support from administrators, tutors, or teachers. Such support people may not always be available because of staffing limitations and the flexible way in which PLATO is used. During summer school, an instructor is in the classroom at all times, but may not be able to offer complete support due to the nature and size of the class.

Teacher Preparation.

Mr. Akin and the teachers who use PLATO were trained by the company; he received four hours of training, while teachers were given either four hours or two days. All of the teachers in the building have been shown how to get into the program, assign students, and assign activities or courses to students. They were given a notebook to use while rostering students but it appears that it is not widely used, since Mr. Akin makes the initial assignments.

Both teachers who were interviewed had computer experience prior to their training on PLATO. One instructor had taken university courses in keyboarding, word processing, basic spreadsheets, databases, and DOS, and he feels that this training has helped him to use PLATO. This teacher has had two years of experience using computers in education; the second teacher has ten years of experience.

Student Placement in PLATO.

The stated goal of the Piedmont School System is improved SAT9 scores; the stated goal of Piedmont High School is to prepare its students for the AHSGE. All students who fail a subtest of the state exam are required to work on PLATO (or another CAI program). In addition, some students who fail reading or language classes (especially 11th grade English) or geometry may be assigned to PLATO to earn credits when their schedules do not allow them to attend a regular remedial class. Also, PLATO may be used for credit completion when an occasional transfer student needs to finish a class he started elsewhere. In one such unusual situation, a transfer student was given Algebra II with

Assessments recently. (Generally, students are given Algebra I instruction on an older non-PLATO product.)

During both the regular school year and summer school, Mr. Akin has assigned students to PLATO modules according to their individual needs, as determined by subtests of the ASHGE, failed courses, teacher recommendations, and the STAR test for math skills. If a student has failed a subtest of the AHSGE, the individual student reporting form lists the 25 test objectives for each subject area and which ones were failed. These failed objectives provide the framework for assigning PLATO modules. This same procedure is applied when a student has failed a course, and his schedule has not allowed him to enroll in a remedial course; the student is rostered according to teacher recommendations, course goals, and corresponding AHSGE subtest objectives. The STAR test that accompanies *Accelerated Math* has been used to assess a few students. FASTRACK is used to place students who have received very low scores on AHSGE or STAR tests.

Mr. Akin and his staff generally do not use the FASTRACK option because they feel that students have been tested already, either on the AHSGE or in their failed courses. Right or wrong, he says, he and his staff have concluded that further testing is unnecessary for most students. However, FASTRACK is used for students with very low skills as a way of assuring that they receive instruction in foundation skills that they may be lacking. Mr. Akin is concerned that skill-deficient students may not be able to do typical remedial work, and that very basic deficits may not be disclosed by results of tests or courses aimed at typical high school students. He says, "FASTRACK is the best way to determine what they lack."

The PLATO Simulated Test System has not been useful at PHS, because only a simulation of the Alabama Graduation Exam in Math is available.

There are some difficulties at PHS in scheduling individual students on PLATO. Two such challenges found in this evaluation were the amount of time required and potential underestimation of student abilities. The personal attention required from Mr. Akin has taken valuable time, but he values the precision he feels is in the process. The principal's biggest demand came during the first year of PLATO use, when it took so much time to gear up for the system and roster students that student use could not start until January. (When Mr. Akin discovered it was going to take him so long, he thought he was too late to ask for help from PLATO personnel.) Student assignments appear to have worked well, generally. However, during summer school some students had been assigned to PLATO activities that were too simple, their teacher said; two or three learners finished quickly and were then reassigned to additional modules that were more challenging. There were reportedly no students who were given activities that were above their abilities, and that is what Mr. Akin wanted.

Student Computer Use.

The remedial teacher said that she sends students who need preparation for the AHSGE to work on PLATO in the library a few weeks before the test is given in the spring. Her

credit-completion students go to the conference room and are likely to have direction there. The teacher who directed the summer school program liked using PLATO and said it worked well; he was happy with the progress students had made. Mr. Akin is committed to using PLATO and is pleased with the progress that students have made.

In general, Piedmont students are encouraged to begin with the tutorial and do all parts of each activity. However, one teacher said, "Learners can place out of a module by taking the mastery test first; the option is not turned off." Students who fail a mastery test are required to repeat the related tutorial before trying the test again. Another teacher said, "What my students are told to do in a module is determined by how much time they have."

Piedmont educators reported that students have not been unruly on the computers, and they believe the good behavior is a result of their system setup. One teacher explained, "The school has a filtering system that blocks unauthorized access to the Internet; it also requires students to log in and out of the system under their own names and records what programs they have used."

The remedial teacher was pleased to describe a mentally challenged young woman who made remarkable progress because of PLATO—progress that she did not think would have been possible otherwise. "I had this girl for English. When she came into the tenth grade class she couldn't participate with other low achievers. As a senior, she came in with a schedule to work only on PLATO. It worked for her. She covered all of the modules for language and reading and graduated."

Monitoring Student Achievement.

When students are monitored, tutors, teachers, and administrators walk around the room, observing what students are doing and answering their questions. Teachers run reports occasionally to check on student efforts and success—especially if they doubt that students are working appropriately. When instructors have time, they may work with struggling students as they do PLATO activities. One teacher expressed the feeling that some students work well—perhaps even better—when they work on their own. When asked how her PLATO students are monitored, one teacher responded by saying students are automatically monitored by the program. She does not usually print reports, but occasionally she asks students to pull up their work record and mastery test results on the screen for her review.

Encouraging Student Performance.

Piedmont educators feel that students are motivated by the fact that they know the AHSGE is coming and that their graduation depends upon those test results. Mr. Akin tells them, "You better get to work or you aren't going to finish." Other teachers assume students are working and check on them if behavior is suspect.

Students who attend summer school because they failed a class are given Carnegie credits and a grade of "C" for Independent Study if they spend enough time in the program. Mr. Akin explains that that letter grade comes from the fact that a score of 75% is the mastery

level score for PLATO[1], and that since students are not required to do other activities there is nothing else to add to that grade. Students who work on PLATO for AHSGE preparation do not receive a grade.

It is common that after taking the AHSGE or one of its subtests, students do not return to use PLATO until after they have received their scores. Until they are told they failed, most students prefer to assume that they have passed the test(s) and do not want to work on remedial tasks.

Learning Materials.

PHS educators said they were not aware that there were PLATO paper materials available for students. PLATO math students are required to bring a notebook each day so that they can do problems on paper; otherwise, "some students try to do problems mentally and [thereby] become confused or make errors."

Two educators use the course instructor guide document for language objectives because they like the way it explains objectives and gives questions. The staff also uses workbooks that are aligned with the graduation exam; although Mr. Akin was not certain, he thought these workbooks were purchased from American Publishing.

In order to provide students with experience answering questions like those on the standardized exam, the language teacher uses her own worksheets with PLATO students. Her worksheets include editing, which is part of the state language exam. "The task of editing," she posited, "is different from choosing a single answer from among a short list of options." Also, she has found that repeating mastery tests is not useful with her students because "the small item pool makes it boring for them."[2]

One instructor reported that sometimes students have a learning "glitch" in which they need personal instructional help to sort out their misconceptions or skills deficits. He described helping such a student by grabbing a textbook and going through concepts with him. Apparently, the student had not been able to find what he needed in the system.

PLATO Problems and Suggestions.

The state graduation exam creates something of a felt need for pre-prepared courses that align totally with that exam. In fact, the primary request from Piedmont staff is for PLATO to match the state exam more closely. While Mr. Akin has constructed PLATO courses that are as closely aligned to AHSGE objectives as possible, there is nevertheless a feeling in this small group that it could be better. Mr. Akin said, "As it stands, PLATO cannot be used alone for graduation preparation because courses are not closely enough aligned with the state test." The older PLATO Reading course is reportedly better than

---

[1] Mastery tests have a passing score of 80%. Cumulative tests are longer, and can be set to any passing score.—*ed.*

[2] Mastery tests have an item pool 3 times larger than the test length, and items are randomly selected from the pool.—*ed.*

the recently updated version in this regard. Also, one teacher would like to have more topics added.

Mr. Akin and the language arts/remedial reading teacher said that PLATO test items are not like those on the AHSGE, and that using the same format would provide better test preparation.[3] The teacher said, "They do lessons with 'next, next, next' and then sit down to 100 questions [on the state exam]," implying that the state test items do not present questions in the progressive disclosure style of tutorials. (Her descriptions of student PLATO use imply that she may not be fully aware of the variation of test item formats within PLATO activities, since the mastery tests do seem to follow the format recommendations she made.) Her other recommendation was that language students need experience editing the work of others—finding what is incorrect in another person's work—especially since that skill is tested on the state exam.

Recommendations were made that PLATO have greater depth in instruction and testing. Mr. Akin would suggest changing the PLATO mastery tests because they are too easy and would be improved by more higher-order questions. Giving an example, he spontaneously suggested that instead of asking learners to identify the correct verb to use out of three choices for one sentence, ask them "which of the following sentences uses the verb in the correct tense?" He also suggested that as good as PLATO is at teaching skills, even more depth could be added.[4]

Even though teachers were given PLATO books to use while being trained, it does not appear that they use them very much. As mentioned earlier, Mr. Akin rosters most students and assigns their activities. One teacher commented that with his own intermittent and limited use of PLATO, it was more difficult to do such tasks as adding modules, and that the reference book was awkward to use. That teacher's preference would be to have more complete descriptions of activities and courses given in the on-screen computer program listings and get rid of the book altogether.

Two respondents referred to a need for computers, thereby indicating that access is a roadblock for Piedmont's PLATO use at present. It appears from various comments—and the small number of PLATO users—that most Piedmont teachers are not interested currently in using PLATO. Mr. Akin says that he takes responsibility for that, but he adds that teachers who do use it see the value. There is some concern among staff that software such as PLATO will replace teachers, but "hardly anybody is anti-PLATO."

Data Analysis

Data for the evaluation were collected from five sources: PLATO system use data, standardized test results from the Alabama High School Graduation Exam (AHSGE), interviews with educators at Piedmont, surveys of Piedmont teachers, and surveys of Piedmont students.

---

[3] The PLATO simulated test system emulates the content, look and feel of state standards tests. However, it was not part of this study.

[4] New courseware and major expansions and upgrades are in development continually.—*ed.*

PLATO system use data included student-level information on the name and type of PLATO activities attempted, completed, and mastered. It also contained the total time students were engaged with each activity and the dates of their PLATO use.

The state graduation exam has four subtests that are reported in this study: Reading, Language, Science, and Math. (A fifth subtest, Social Studies, was added recently to the AHSGE, but it is not part of this study since PHS students have not worked on that topic in PLATO. Also, the test has not been normed and only raw scores are provided.) In the past two years, most students have taken the AHSGE for the first time in the spring of their 10th grade year; those who have failed a subtest could take it again in the spring of their 11th grade year. Seniors who have not taken all of the subtests or have failed them, or transfer students, may take tests at any one of four times: summer, fall, winter, and spring. (As of the 2001-2002 school year, 9th grade students may take the math and science subtests in the spring, after they have completed biology and Algebra I.)

Reports of AHSGE scores for PLATO and non-PLATO students at Piedmont were obtained for seven testing periods. The Reading, Language, Science, Math subtest scores report "pass" for students who met the minimum criteria; more detailed scale scores are provided only for those who failed a subtest. Social Studies outcomes were reported as a raw score only. After an inquiry by Mr. Akin, it became apparent that scale scores for passing students could not be obtained for any subtest, since the state department of education would need to contact the company that scores the test and parents would need to sign permission forms.

The results of phone interviews with Mr. Akin and two teachers have been integrated throughout the earlier parts of this report that describe the context and implementation of the PLATO program at PHS. PLATO Instructor Surveys were completed by five Piedmont teachers and PLATO Learner Surveys were answered by twenty-two students.

PLATO Use and Test Score Findings

Of the 277 Piedmont students for whom AHSGE data were supplied, 130 had been enrolled in PLATO at some point during the two school years of study and 147 had not. In addition, PLATO information was provided for 36 tenth grade students who have no AHSGE test scores; they will be tested for the first time in March 2002.

The following sections describe the level of PLATO use by the 166 students enrolled in PLATO. They then compare AHSGE scores for both PLATO and non-PLATO students, and examine different levels of PLATO use.

PLATO Use.

As described earlier, students were enrolled for one or more time periods during the study. During this time they studied math, language arts, reading or science activities plus a few miscellaneous topics. The following table shows the enrollment numbers for PLATO across the seven time periods for which we have tests.

Table 1. PLATO Enrollment by Time Period

Period Ending with Testing In	Number Enrolled
March 2000	68
July 2000	21
October 2000	25
December 2000	10
March 2001	43
July 2001	38
October 2001	30

Note, the total number of enrollments, 235, is greater than the total number of PLATO students, 166, because some students were enrolled for more than one time period.

The median number of activities started by the 166 students during the study was about 36 (mean of 70). The median number of activities completed by the students was about 29 (mean of 60). And, the median number of activities mastered by students during the study was about 15 (mean of 32). The median amount of time students spent engaged in studying PLATO activities was about three hours and fifty minutes (mean of just under six hours). Table 2 provides more detailed breakdowns on these variables.

Table 2. PLATO Use Variables

Variables	Median	Mean	Standard Deviation	Minimum	Maximum
Activities Started	35.5	69.6	94.3	1	488
Activities Completed	28.5	59.8	89.8	0	478
Activities Mastered	14.5	32.4	44.6	0	230
Minutes Engaged in Activities	229 min	597 min	1,082 min	0.2 min	6,054 min

Just over one-half of the PLATO activities studied by the Piedmont students were math activities. About one-third of the activities were language arts activities. About one-tenth of the activities were from the PLATO reading curriculum, with a small additional percentage from the science curriculum.

Table 3. Curriculum Areas of PLATO Activities

	Frequency	Percent
Math	5715	52.5%
Language Arts	3792	34.8%
Reading	1053	9.7%
Science	331	3.0%
Total	10891	100.0%

BEST COPY AVAILABLE

Test Score Findings.

For purposes of this report, student results for the AHSGE were provided for seven testing dates: Spring and summer for the 1999-2000 school year; fall, winter, spring and summer of 2000-2001 school year; and fall of the 2001-2002 school year. (The actual months for testing are October, December, March, and July.) Spring test scores are reported for students in all grades at Piedmont; winter, summer, and fall scores reflect only senior students who are allowed to take the entire exam or subtests four times during the school year. The total number of students taking at least one subtest is 277; of these test takers, 130 had used PLATO and 147 had not. Test scores for both groups are used in this report.

PLATO system report information included data for 166 students, all of which was used for descriptions of PLATO use as provided in this report. Of the 166 PLATO student records, 130 could be matched with AHSGE test scores; 36 PLATO students had not yet taken the AHSGE.

The following figures and text explain the performance of Piedmont students on the AHSGE—including those who did and did not use PLATO. It must be noted again that AHSGE reports, on which this report is based, provided pass/fail scores for each subtest, and only failed tests were reported with scale scores. Since scale scores could not be used for all data analysis, success is reported in the following figures and text as a percentage of the students who passed.

Students could take the AHSGE several times, particularly if they did not pass on the first administration of the test. Before we could compare the passing percentages for PLATO and non-PLATO students, we needed to decide how to handle the multiple test scores. It was decided to look at both the lowest test score and the highest score for all students. Since the lowest score is usually taken before being enrolled in PLATO, it is the best indicator of the starting status of PLATO students. And since the students have to pass the tests to graduate, the highest score is the one that shows the students' eventual status. If students did not pass on one test administration but did on another, then their lowest scores would be failing and their highest scores would be passing. If they did not pass any attempts, then their lowest and highest scores would be failing. If students have only one score, then that score was used for both the lowest and highest scores.

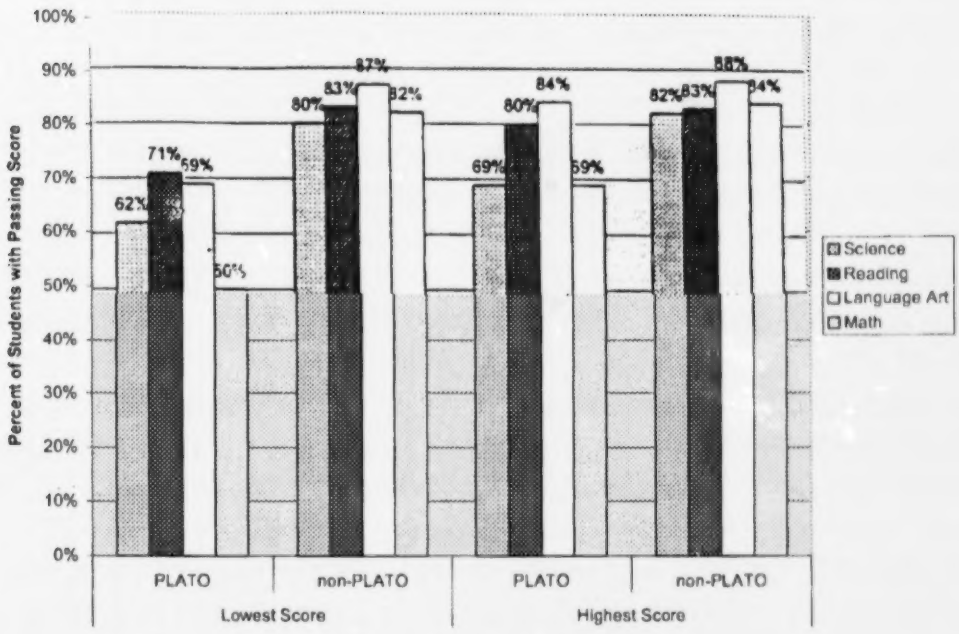

Figure 1. Percent of Students with Passing Scores on AHSGE

PLATO students improved their test scores after using PLATO. Also, in comparison, PLATO students made proportionately higher gains; i.e., the increase from lowest to highest scores is greater for them. The greatest increases for PLATO students came in math and language; since a high proportion of PLATO students study math, this is a very positive outcome. The lowest gains were seen in science, which also has been the least studied area on PLATO. (PHS has had the old version of the PLATO science curriculum until recently.)

PLATO students made substantial gains in passing rates. In fact, they almost completely caught up with the non-PLATO students in reading (highest: 80% PLATO, 83% non-PLATO) and language arts (highest: 84% PLATO, 88% non-PLATO). And, although PLATO students still score lower in math (highest: 69% PLATO, 84% non-PLATO), PLATO students make their biggest gains on this test from lowest to highest scores (gains: 19% PLATO, 2% non-PLATO). These are substantial gains, particularly considering the varying conditions under which the PLATO system is used at Piedmont.

PLATO students scored lower than did non-PLATO student on all AHSGE sub-scales, but this is exactly what we would expect, given the selection criteria that have been used for choosing PLATO students—the need for remedial help to pass tests or classes.

BEST COPY AVAILABLE

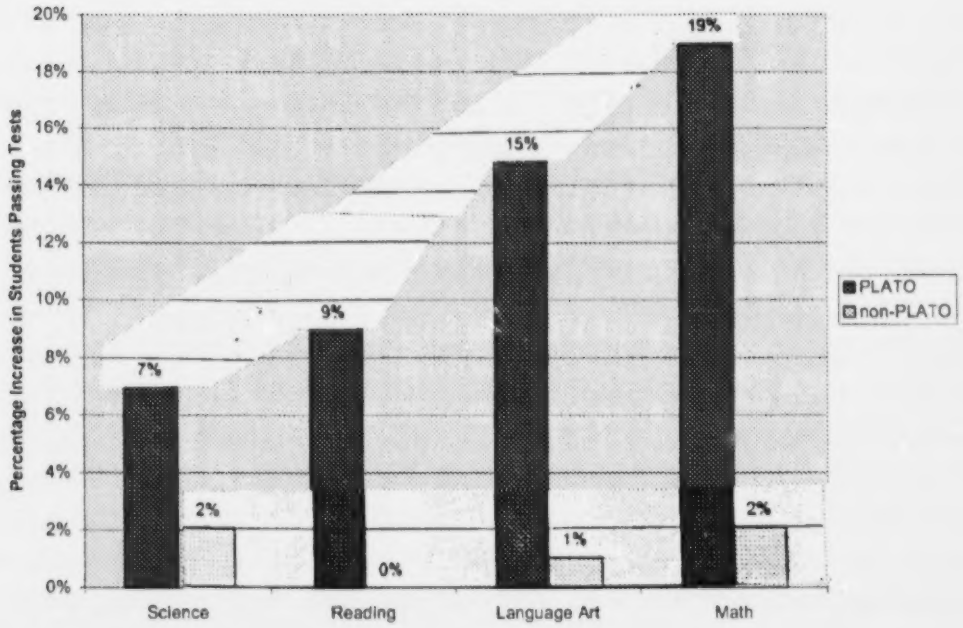

Figure 2. Percentage Increase in Students Passing Tests

PLATO students increased their passing rates from lowest to highest scores more than did the non-PLATO students. PLATO students gained from five percent to seventeen percent above the gains of the non-PLATO students, as shown in Figure 2. In fact, the PLATO students' gains over non-PLATO students' gains were statistically significant for math, language arts, and reading sub-scales of the AHSGE. The higher PLATO gain on the science sub-scale was not statistically significant.

Table 3. AHSGE Sub-Scale Statistics for PLATO and non-PLATO Students

Sub-Scale (High – Low)	Was Student Ever in PLATO?	Number of Students	Mean % Gain	Standard Deviation of % Gain	t*	df	Sig. (2-tailed)	Effect Size
Reading Gain	No	109	0.0%	0.0%	-3.471	115.0	0.001	0.645
	Yes	116	9.5%	29.4%				
Language Gain	No	109	0.9%	9.6%	-4.173	131.8	0.000	0.636
	Yes	116	15.5%	36.4%				
Math Gain	No	145	2.1%	14.3%	-4.692	157.4	0.000	0.642
	Yes	129	19.4%	39.7%				
Science Gain	No	109	1.8%	13.5%	-1.890	174.9	0.060	0.262
	Yes	115	7.0%	25.6%				

*Independent samples t-test for equality of means, equal variances not assumed

One question that often arises when discussing mean differences between two groups is the size of that difference. A common measure for the difference between two group

BEST COPY AVAILABLE

means is called effect size. Effect size is calculated by subtracting the smaller mean from the larger mean and then dividing the result by the average of the two standard deviations for the means. When we do this for the reading, language arts, and math scores we find that for all three measures there was an effect size of .64 standard deviations. The equal effect sizes occurred because larger gain scores in language arts and math were balanced out by larger standard deviations. The effect size for science was only .26 of a standard deviation. An effect of .64 standard deviations is a moderately large effect size; an effect of .26 is quite small. In educational research an effect size of .75 or greater is usually considered large, from .50 to .75 is moderately large, and from .25 to .50 is usually considered moderate to small. An effect size that is less than .25 standard deviations is usually considered too small to be educationally interesting.

Relating PLATO Use to AHSGE Test Scores.

The data displayed in Figure 3 refers to students who were assigned to PLATO prior to or during the semester in which they took the AHSGE.

AHSGE outcome data for PLATO learners was divided into two categories—passing and failing—and then analyzed along with PLATO use data—number of activities completed and number of activities mastered. The question was posed: How many PLATO activities did both passing and failing students complete or master?

Students who passed AHSGE subtests had completed an average of between 21 and 28 PLATO activities; students who failed subtests had completed an average of between 26 and 50 PLATO activities. At first glance, it seems that learners with lower skill levels may have done more preparatory activities to lay a foundation for learning. In looking further, the conclusion can be drawn from these numbers that merely completing activities does not presage test success. Furthermore, when activities were *mastered* by both passing and failing students, rather than merely completed, there was much less difference between student groups. Passing students mastered an average of between 14 and 18 modules; failing students mastered an average of between 16 and 25 modules. From prior research we have found that mastering the content of instruction, not merely putting in seat time, contributes to higher achievement. If a portion of students using PLATO are trying to "get out" of the PLATO modules by pressing keys, they might show a pattern like this of "completing" but not mastering modules.

From these finding it appears that students at Piedmont were not usually required to master the modules they studied. This is indicated by having a high percentage of completed modules that were not mastered by the students. Completion of an activity without mastering the activity does not necessarily translate into increased student learning. Requiring mastery of the activities would probably increase student achievement and result in a more positive relationship between activities mastered and higher test scores.

Extending the analysis provided in Figure 3, it was demonstrated that passing and failing students were very similar to each other in the percentage of activities that they had

mastered from among all the activities they had attempted. In all three subject areas that were compared, from 39% to 49% of the activities studied were mastered by all PLATO students, whether they passed or failed a test. Subject by subject, students who passed tests bested those who failed by no more than an 8%, and were even lower by 1% in one subject.

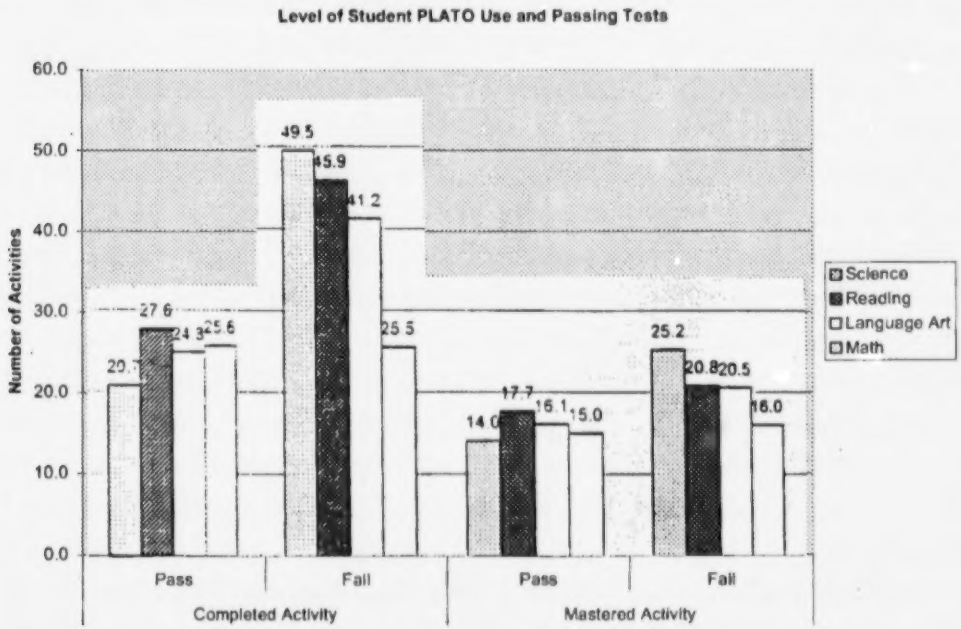

Figure 3. Level of Student PLATO Use Compared to Test Results

If we were to speculate on why this weak relationship exists between mastering activities and passing subtests, we might conclude that several factors are in operation. First, Piedmont has different strategies for using PLATO; the summer strategy seems to have active supervision of students on PLATO but the school-year use seems to be somewhat less so. From our interviews, it was clear that student placement in PLATO was more often not based upon the PLATO pretests. This would result in a poorer match between activities assigned and student needs. The apparent lack of a requirement to master PLATO activities may well be a contributor to a weak relationship between PLATO use and test scores. In contrast, PLATO implementations in other schools where there is stricter implementation, the correlation of module mastery to achievement generally runs in the .30 range. These schools provide active, ongoing supervision of students, and employ the full PLATO model, including placement tests and individualized prescriptions. They also establish an expectation that students will master an activity before proceeding.

BEST COPY AVAILABLE

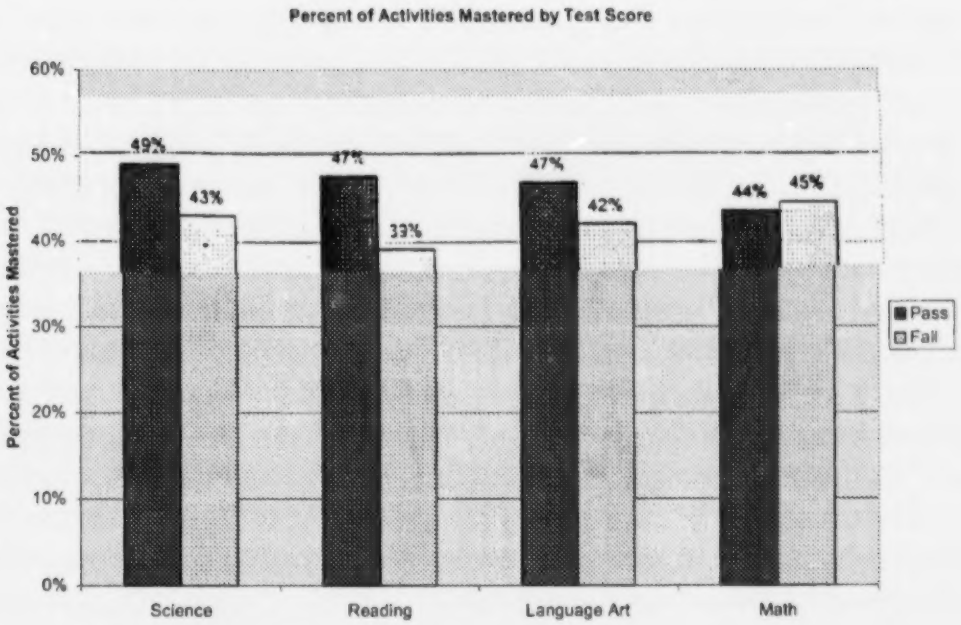

Figure 4. Percent of Activities Mastered by Test Score

Instructor's Survey Responses

Each question on the Instructor Survey was rated by respondents according to a five-point scale and presented as follows in two figures: one that displays the number of categorical responses to each question and one that shows the average response to each question. The average response for each question was needed so that a variety of answer patterns could be compared fairly, overall. To obtain averages, options on the answer scale were assigned uniformly increasing numbers, which then were averaged. Both charts for each Survey question are arranged top to bottom, from highest to lowest *average* rating; discussions reference number of responses by category. Questions are grouped for comparison and brevity according to general topic.

PLATO Content.

For questions regarding PLATO content, the highest average score was given to the current nature of the information; three teachers strongly agreed that content is up-to-date, and two agreed. Educators also agreed (two, strongly) that content was generally free of errors and that content for topics was good. Teachers agreed (one strongly) that students understood the explanations and that PLATO content aligns with their standard test. When asked about adequate depth and course alignment with teacher goals, all agreed, but not strongly. These responses are basically consistent with interviews, which disclosed desires for a program that is completely aligned with the AHSGE.

BEST COPY AVAILABLE

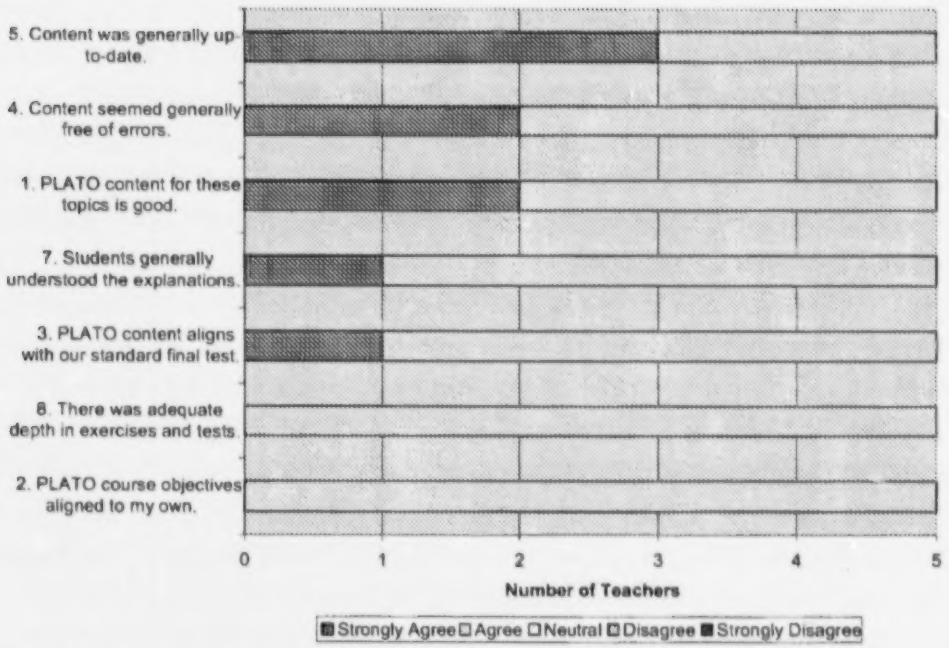
5. Content was generally up-to-date.
4. Content seemed generally free of errors.
1. PLATO content for these topics is good.
7. Students generally understood the explanations.
3. PLATO content aligns with our standard final test.
8. There was adequate depth in exercises and tests.
2. PLATO course objectives aligned to my own.
0
1
2
3
4
5
Number of Teachers
Strongly Agree Agree Neutral Disagree Strongly Disagree

Figure 5. Frequency of Teacher Response on PLATO Content

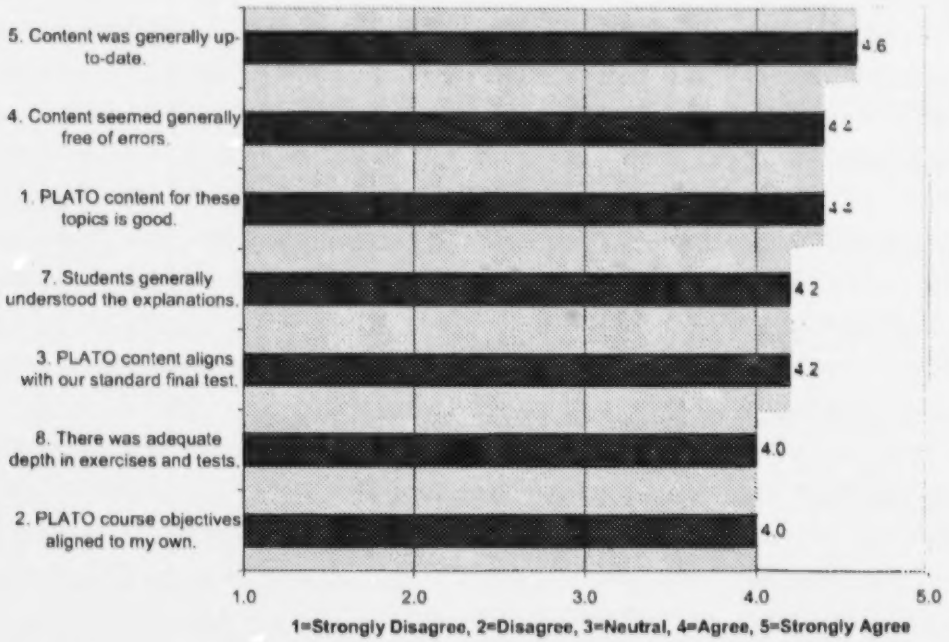

Figure 6. Mean Teacher Rating on PLATO Content

BEST COPY AVAILABLE

Instructional Issues.

Most of the Piedmont teachers were satisfied with the instructional style of PLATO activities. One teacher disagreed that the style of instruction was consistent throughout the program, and one was concerned about lack of time on PLATO computers. All of the educators agreed that their training was adequate, and three expressed interest in more training.

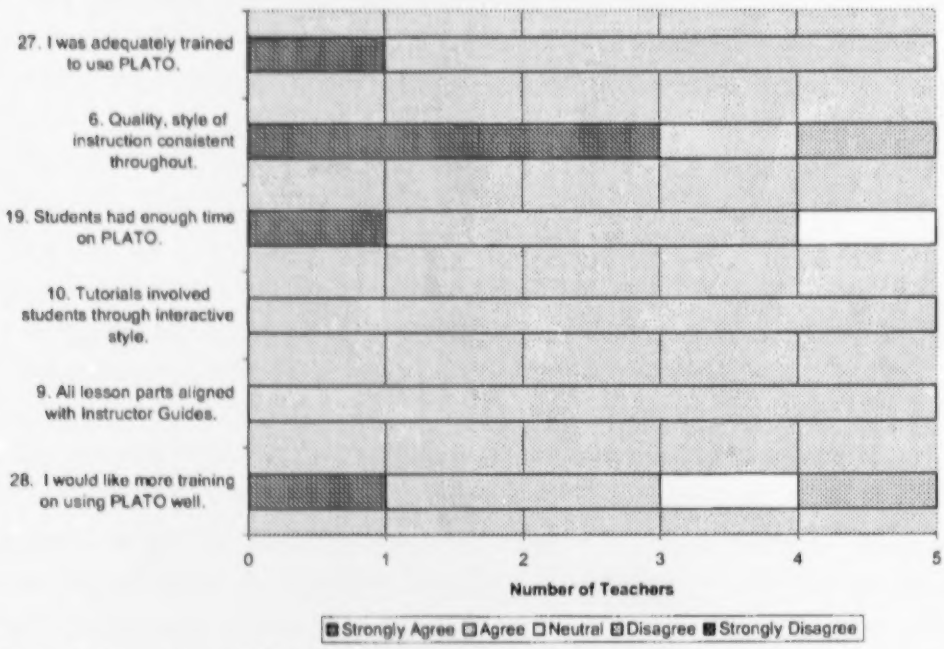

Figure 7. Frequency of Teacher Response on Instructional Issues

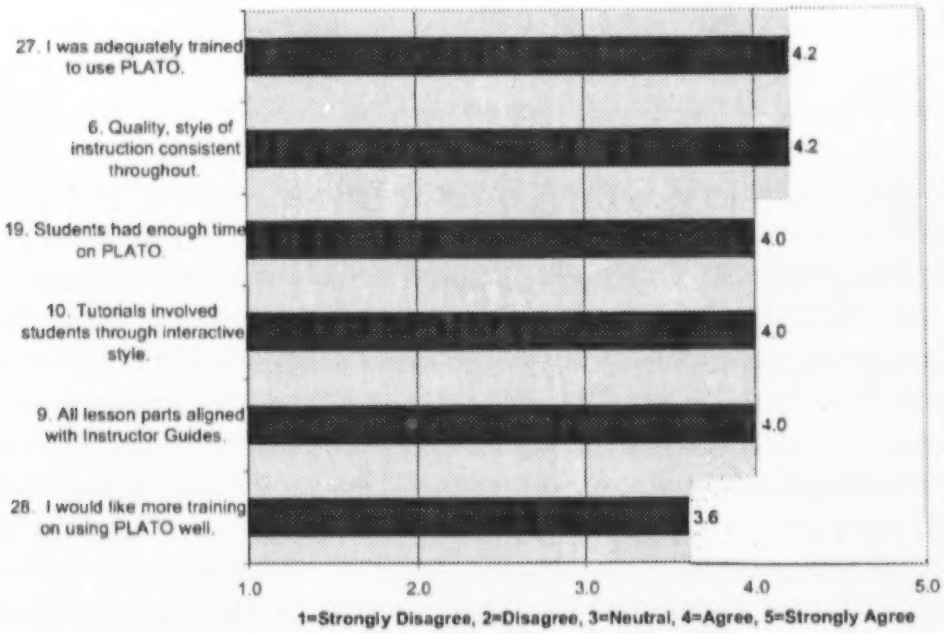

Figure 8. Mean Teacher Rating on Instructional Issues

Technical Issues.

Teachers were satisfied with the technical issues regarding PLATO software. They agreed that graphics and color are appropriate and that the software is reliable and readable. One teacher agreed strongly regarding the first three issues—graphics, color, and reliability. One person disagreed, however, that PLATO used consistent keystrokes and display style.

BEST COPY AVAILABLE

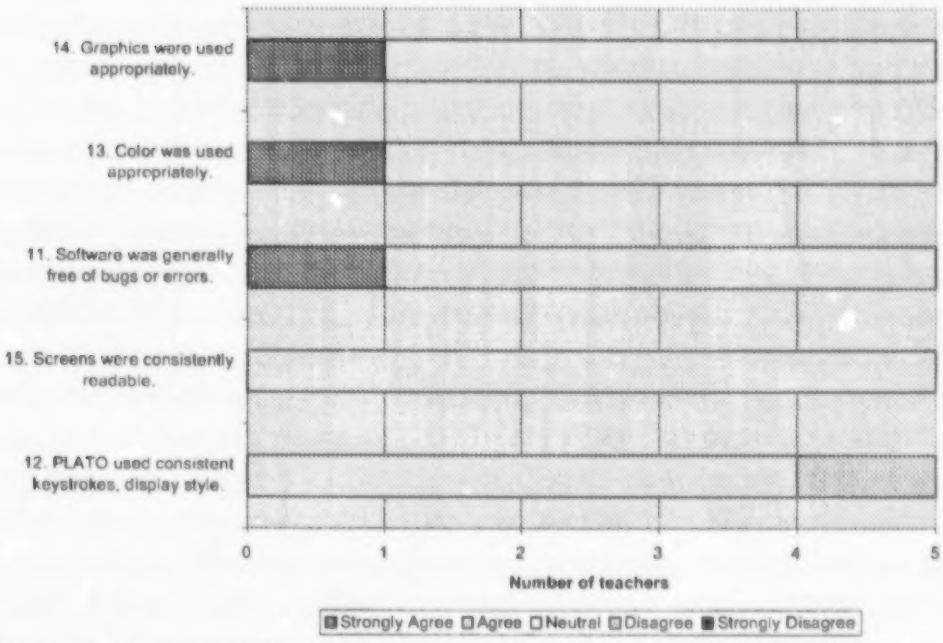

Figure 9. Frequency of Teacher Response on Technical Issues

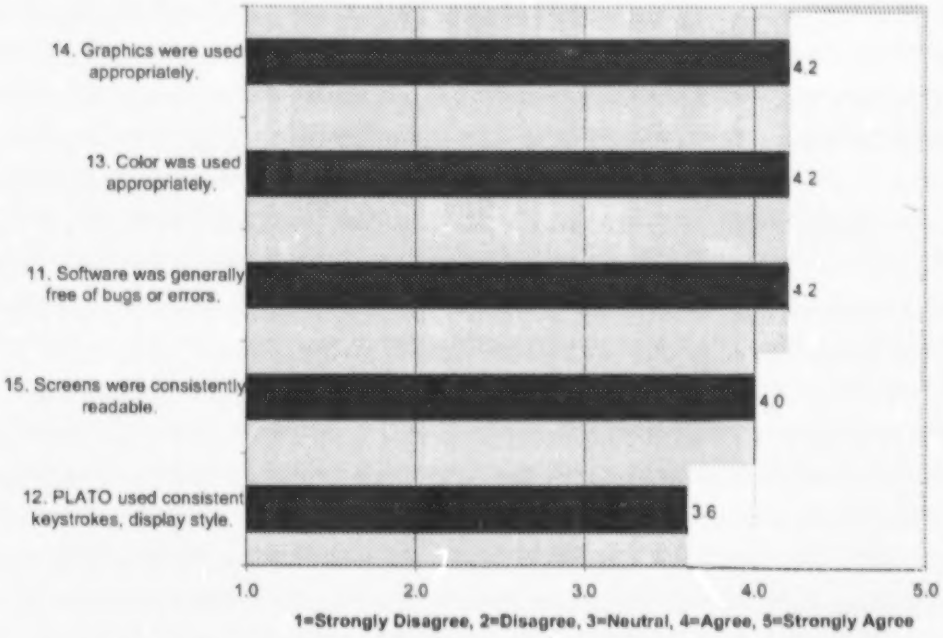

Figure 10. Mean Teacher Rating on Technical Issues

BEST COPY AVAILABLE

Teacher Affect.

Affective questions, dealing with teacher experience with PLATO and their feelings about it, were very positive. Teachers agreed (two strongly so) that the system was useful in teaching and that they enjoyed using it. They found the computer work productive and they were able to make assignments with it. Printing reports, however, received two "neutral" scores, which could be interpreted as ambivalence, no opinion, or lack of experience. In this case, given the information from interviews, it appears that two of the five PLATO instructors did not use printed reports and therefore declined to comment.

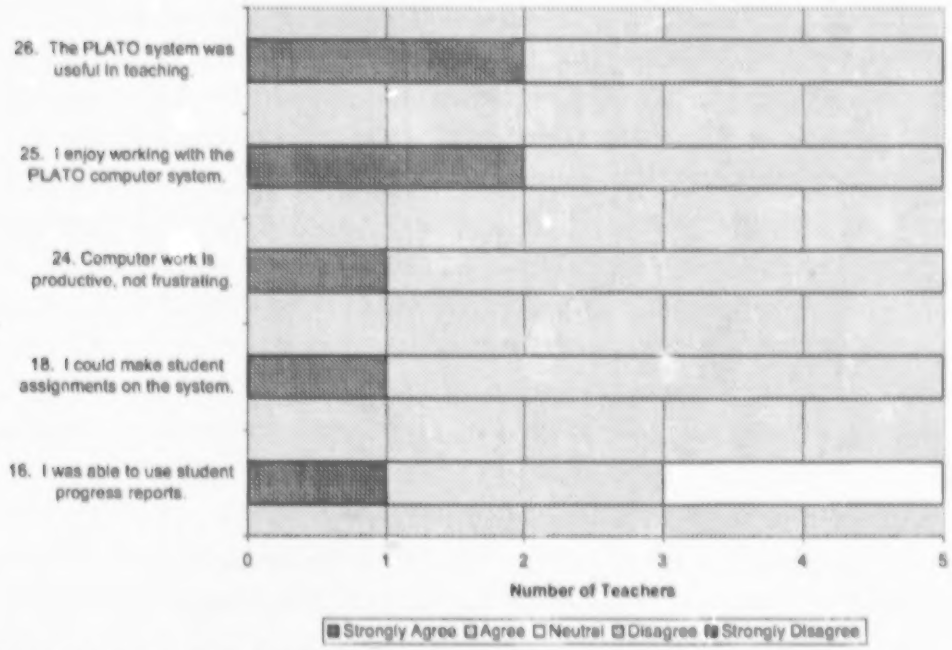

Figure 11. Frequency of Teacher Response on Teacher Affect

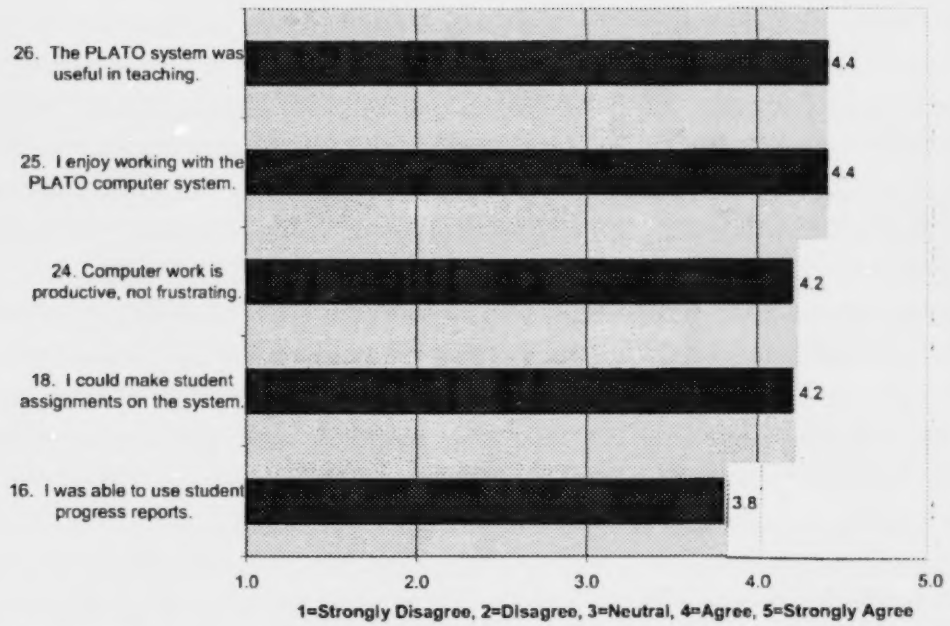

Figure 12. Mean Teacher Rating on Teacher Affect

PLATO Student Usability.

In their highest consensus and rating, teachers strongly agreed that students were seldom confused or trapped by the program. Their replies indicate a consensus that students were comfortable using the system. They also agreed that students responded well to PLATO, that they could tutor students while a group worked on PLATO, and that they could relate PLATO to classroom instruction.

BEST COPY AVAILABLE

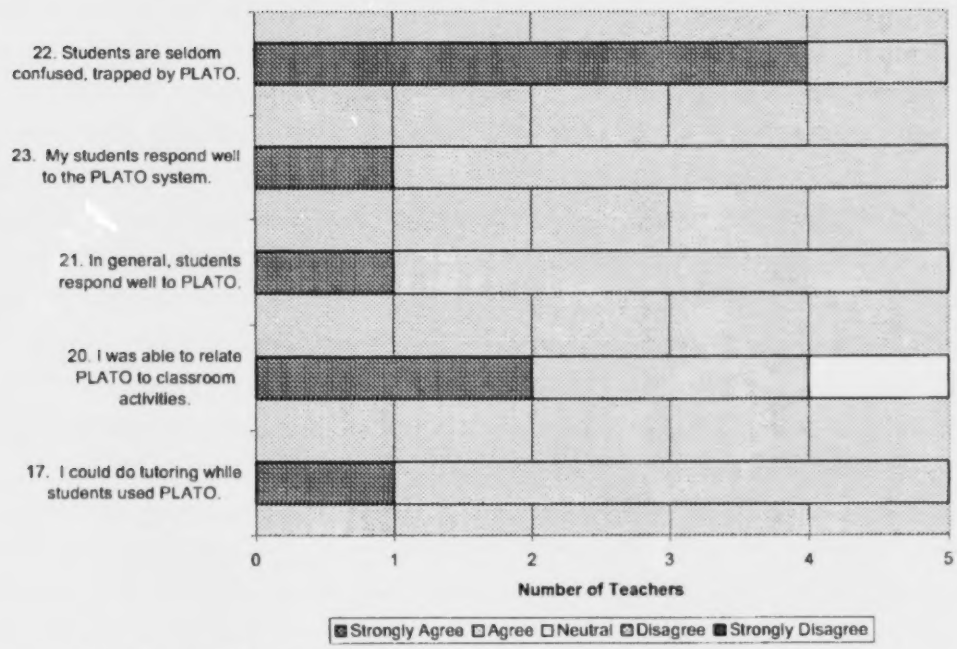

Figure 13. Frequency of Teacher Response on PLATO Student Usability

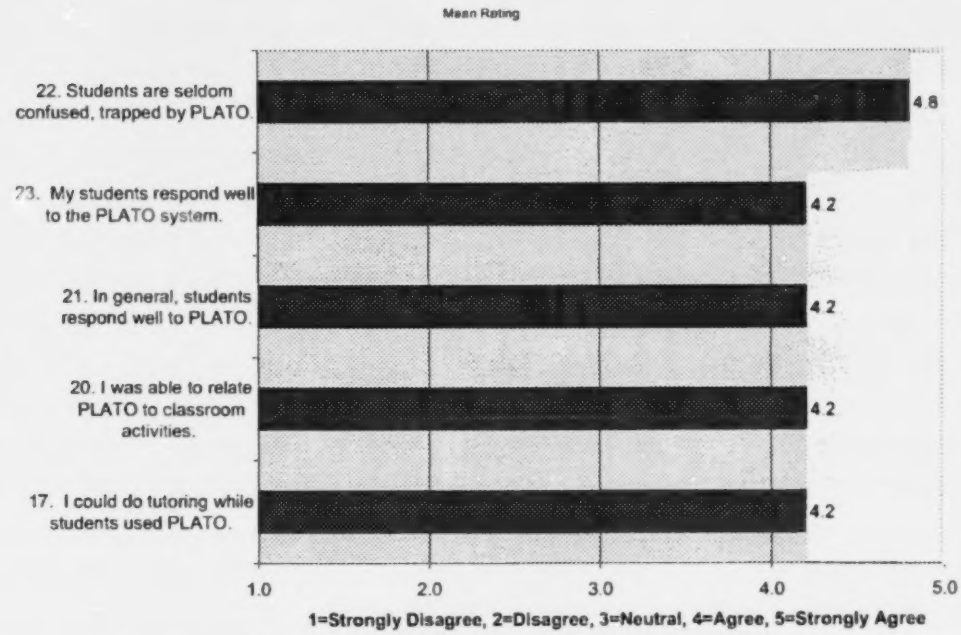

Figure 14. Mean Teacher Rating on PLATO Student Usability

BEST COPY AVAILABLE

Integration into Other Instruction.

Teachers reported that they often related PLATO assignments to personal experiences and discussed information that was prerequisite to working on PLATO. Two of the instructors regularly explained how PLATO fits into course goals; however, they only occasionally described any learning objectives. Likewise, they occasionally referred to incentives for doing well in the program; this is consistent with other information sources, that incentives have not been part of Piedmont's approach. The fact that staff only occasionally explained how to get help on PLATO is positive and consistent with other responses; i.e., most students knew how to use the system.

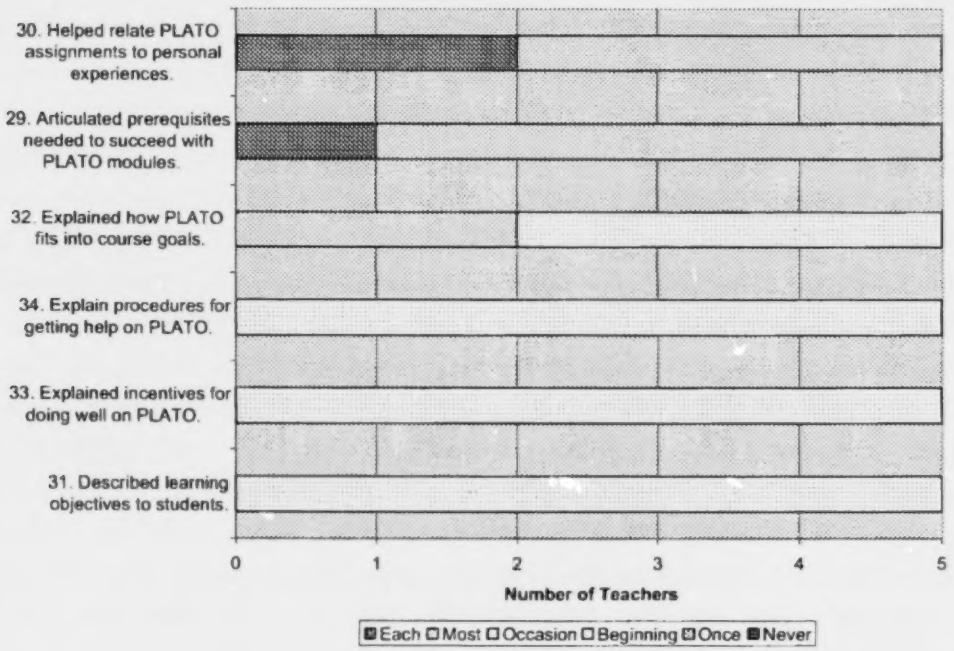
30. Helped relate PLATO assignments to personal experiences.
29. Articulated prerequisites needed to succeed with PLATO modules.
32. Explained how PLATO fits into course goals.
34. Explain procedures for getting help on PLATO.
33. Explained incentives for doing well on PLATO.
31. Described learning objectives to students.
0
1
2
3
4
5
Number of Teachers
Each Most Occasion Beginning Once Never

Figure 15. Frequency of Teacher Response on Integration into Other Instruction

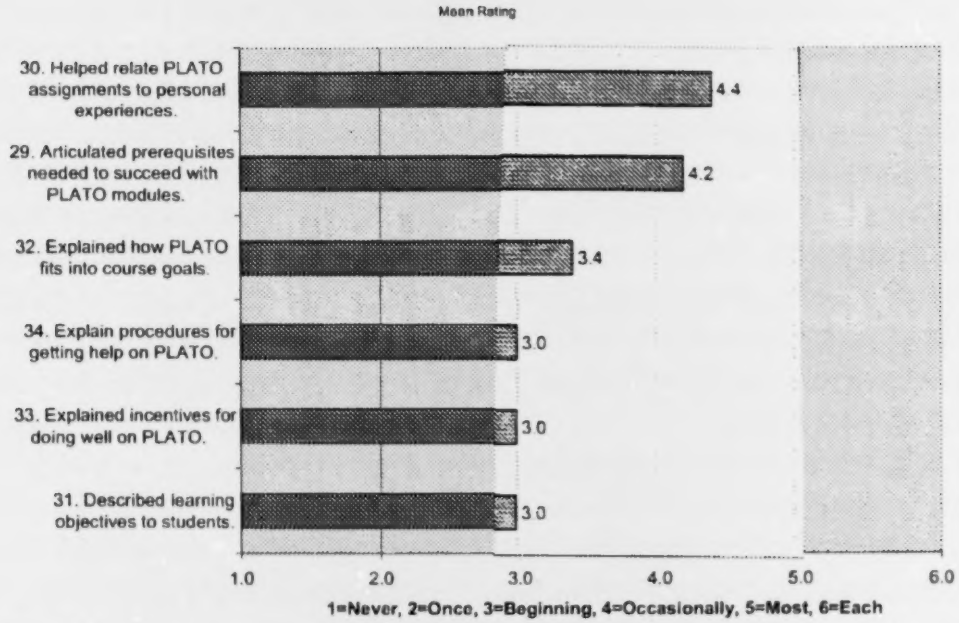

Figure 16. Mean Teacher Rating on Integration into Other Instruction

Open-Ended Questions.

The Instructor's PLATO Evaluation ended with seven open-ended questions. Since there were only five respondents, issues addressed in this section will be discussed in groups. The full transcription of questions and answers are presented in the Appendix; responses were brief.

When teachers were asked what they liked **best** about teaching with PLATO, four said that they liked the individualization that the program afforded; one said that the variety of activities was its strength.

What four of the respondents liked **least** about PLATO was more diverse. Two of them said they wanted closer alignment with the state graduation exam (AHSGE), one wanted more higher-order instruction and mastery test questions, one wanted fuller explanations of lesson content on-screen, and one wanted greater access to the program. Suggestions for improvement were alignment with the AHSGE, more depth in activities, expanded lesson titles and explanations on screen, the addition of more topics and keeping information updated.

Learner's Survey Responses

The student survey provides an indication of how 22 Piedmont students perceived the program. Results from this limited number of respondents should be interpreted

BEST COPY AVAILABLE

cautiously; nevertheless, these responses provide indicators of student perceptions. In some cases, student responses differ from the instructor opinions.

Ease of Use.

More than nine of ten respondents (95%) agreed that they could sign into PLATO and move to their working location easily. Nine out of ten (91%) also said that the computer is easy to use and that they could easily work at their own pace; fewer students said that they could start and stop a lesson at will (75%). Three out of four students agreed that the computer allowed them to answer often and be involved (77%) and that they could understand what they were taught (73%). The least positive rating was still high; six out of ten students (59%) said that the computer gave them help when they have needed it.

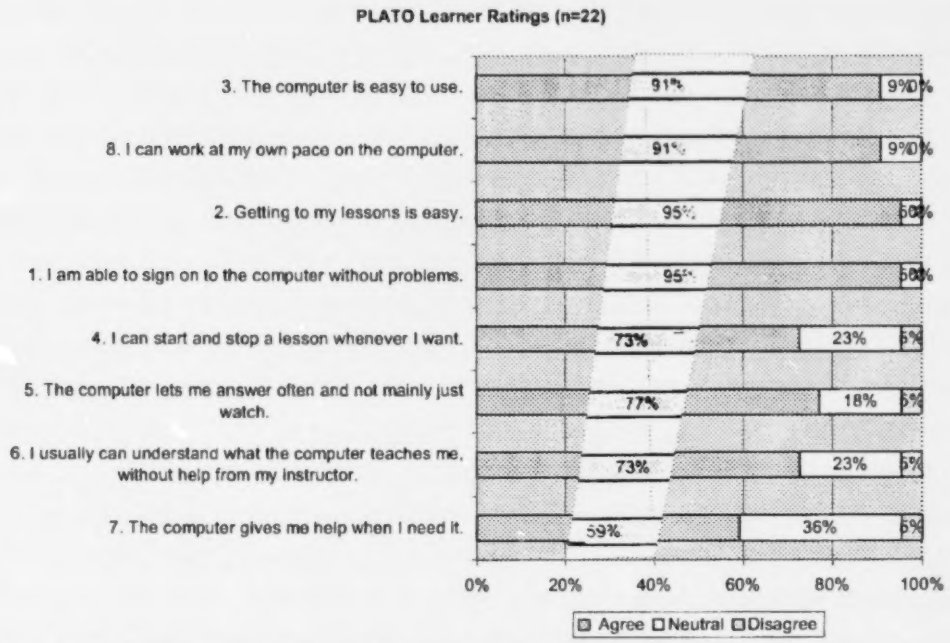
PLATO Learner Ratings (n=22)
3. The computer is easy to use.
8. I can work at my own pace on the computer.
2. Getting to my lessons is easy.
1. I am able to sign on to the computer without problems.
4. I can start and stop a lesson whenever I want.
5. The computer lets me answer often and not mainly just watch.
6. I usually can understand what the computer teaches me, without help from my instructor.
7. The computer gives me help when I need it.
73%
23%
77%
18%
73%
23%
59%
36%
0%
20%
40%
60%
80%
100%
Agree
Neutral
Disagree

Figure 17. Frequency of Student Response on Ease of Use

BEST COPY AVAILABLE

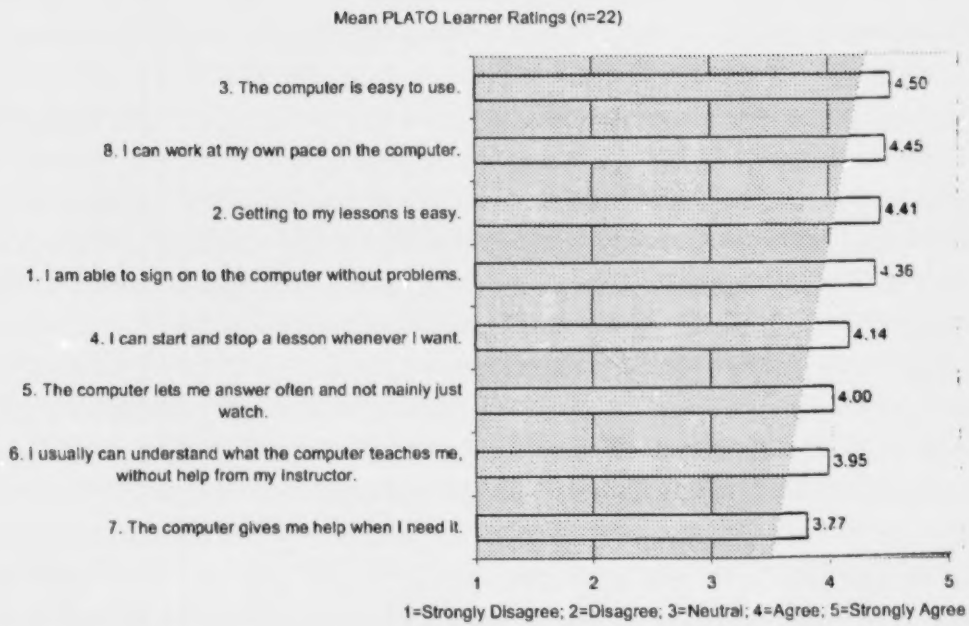
Mean PLATO Learner Ratings (n=22)
3. The computer is easy to use.
8. I can work at my own pace on the computer.
2. Getting to my lessons is easy.
1. I am able to sign on to the computer without problems.
4. I can start and stop a lesson whenever I want.
5. The computer lets me answer often and not mainly just watch.
6. I usually can understand what the computer teaches me, without help from my instructor.
7. The computer gives me help when I need it.
4.50
4.45
4.41
4.36
4.14
4.00
3.95
3.77
1
2
3
4
5
1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree

Figure 18. Mean Student Rating on Ease of Use

Student-Appropriate Content.

Approximately three-fourths of the PLATO student respondents agreed that they were studying what they should be (77%) and that the activities were designed for people like themselves (68%). Just over half of the students (57%) said that their teacher helped them relate computer work to classroom work. Fewer (41%) said that they were studying the same topic on the computer and in the classroom.

BEST COPY AVAILABLE

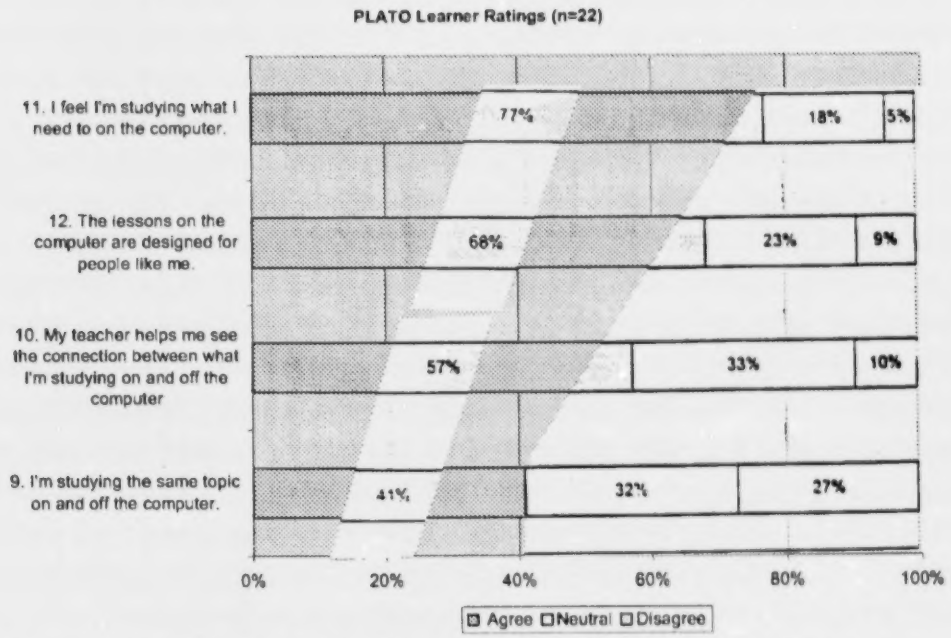

Figure 19. Frequency of Student Response on Student-Appropriate Content

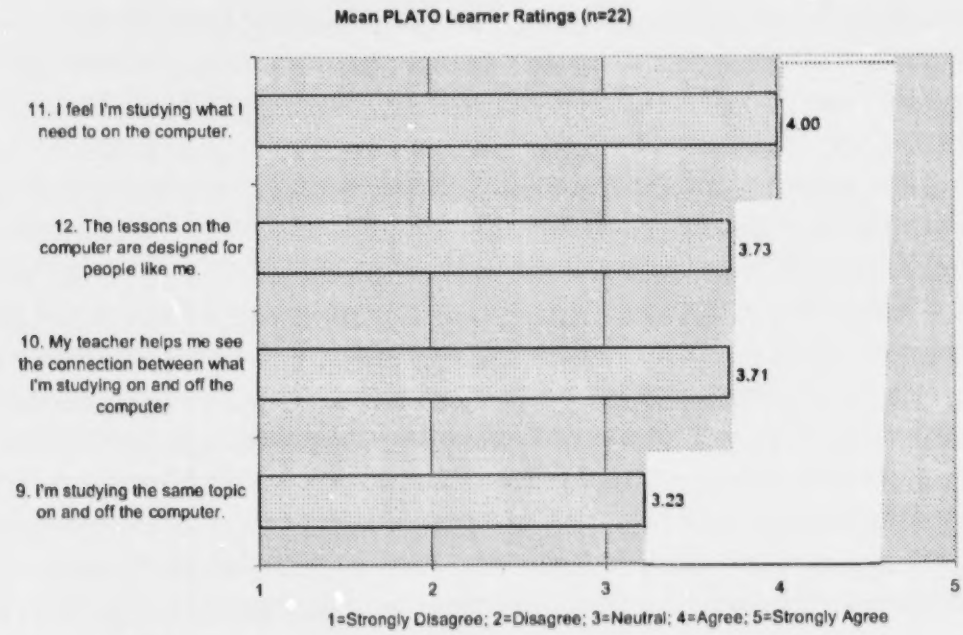
Mean PLATO Learner Ratings (n=22)
11. I feel I'm studying what I need to on the computer.
4.00
12. The lessons on the computer are designed for people like me.
3.73
10. My teacher helps me see the connection between what I'm studying on and off the computer
3.71
9. I'm studying the same topic on and off the computer.
3.23
1
2
3
4
5
1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree

Figure 20. Mean Student Rating on Student-Appropriate Content

BEST COPY AVAILABLE

Student Attitudes toward PLATO.

As a backdrop to survey results, a high proportion of respondents (85%) declared that they have worked hard to learn from the program, and most of them (70%) have had a positive enough experience to recommend learning on computers. Students are fairly evenly divided about whether they would like additional time on the program. Six out of ten students (60%) said that working on PLATO increased their self-confidence about schoolwork, but fewer (45%) credited PLATO with any increase in self-esteem or with lessened self-esteem (25%) as a result of wrong answers. A small proportion of respondents (14%) said that the computer made them nervous, while three-fourths (77%) disagreed with such a notion. Perhaps sending a signal for PLATO consideration, only 45% of the respondents said that they found activities to be interesting, even though (as formerly mentioned) 77% said that what they were studying on PLATO was what they needed.

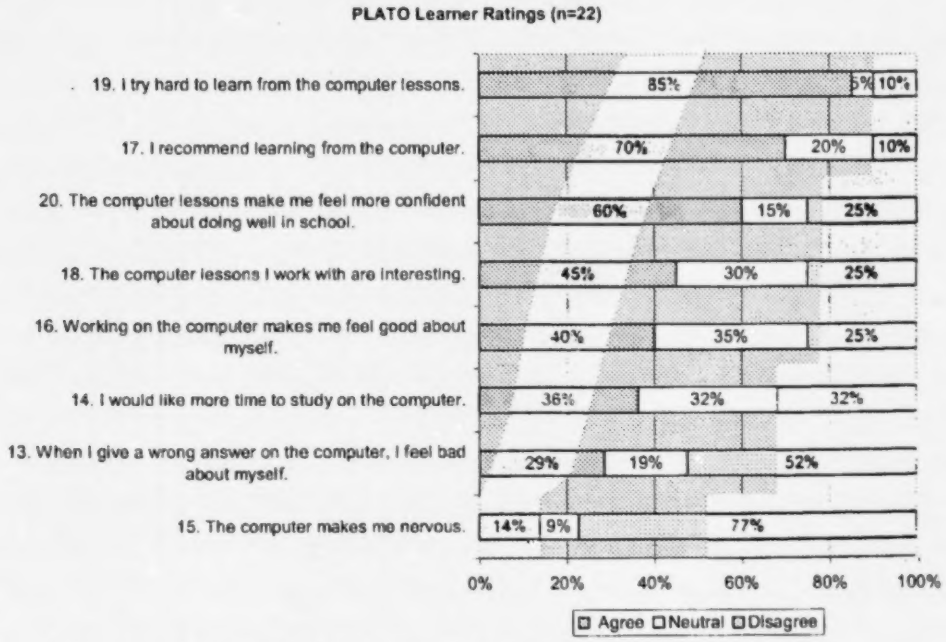

Figure 21. Frequency of Student Response on Attitudes toward PLATO

BEST COPY AVAILABLE

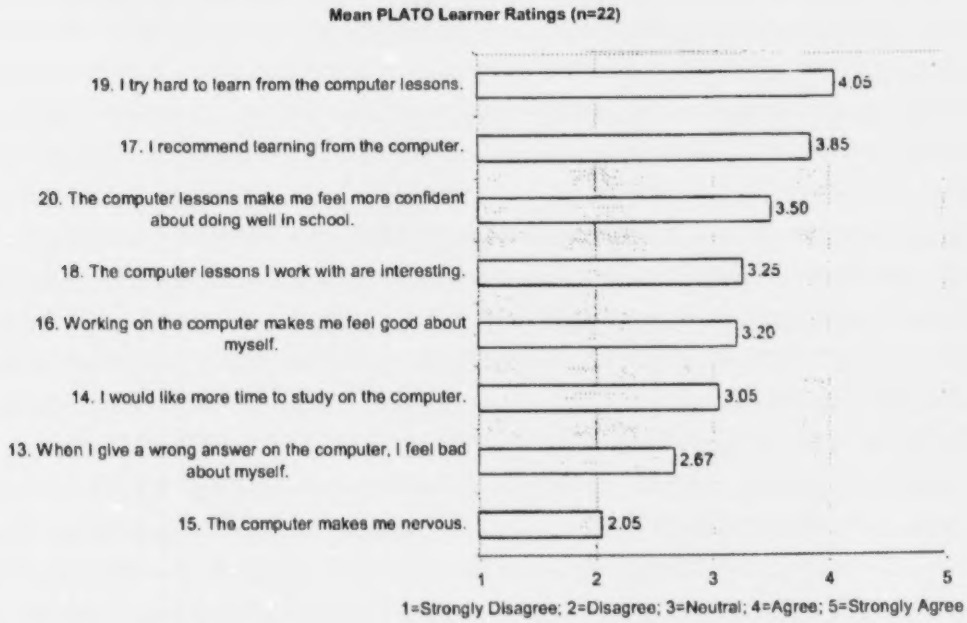
Mean PLATO Learner Ratings (n=22)
19. I try hard to learn from the computer lessons.
4.05
17. I recommend learning from the computer.
3.85
20. The computer lessons make me feel more confident about doing well in school.
3.50
18. The computer lessons I work with are interesting.
3.25
16. Working on the computer makes me feel good about myself.
3.20
14. I would like more time to study on the computer.
3.05
13. When I give a wrong answer on the computer, I feel bad about myself.
2.67
15. The computer makes me nervous.
2.05
1
2
3
4
5
1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree

Figure 22. Mean Student Rating on Attitudes toward PLATO

Helpfulness of Topics.

Math was the most frequently used topic area and was rated also as being the most useful. Science was rated second as being helpful. Reading was rated third for its helpfulness and second for its use; least used was Writing.

BEST COPY AVAILABLE

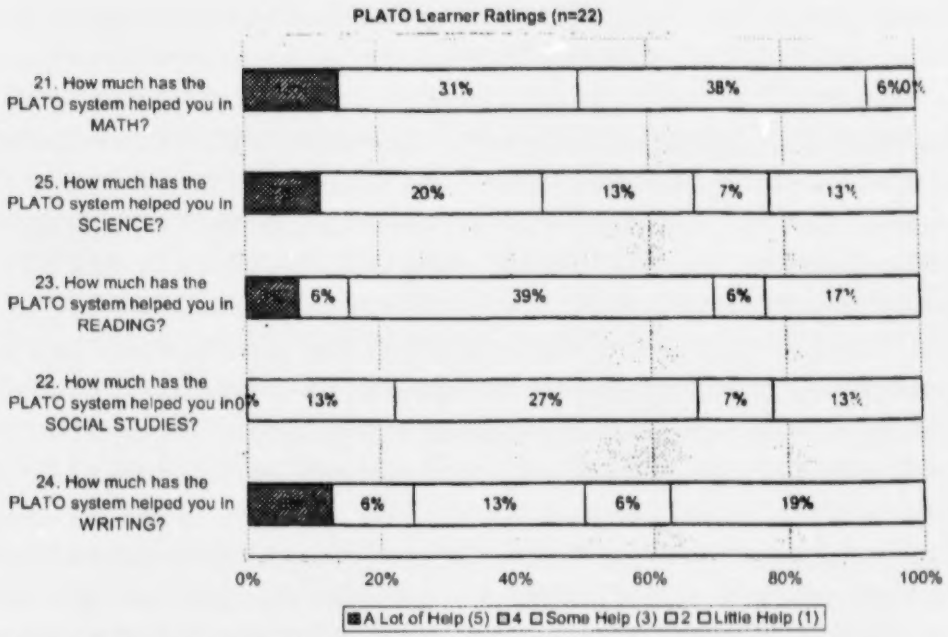

Figure 23. Frequency of Student Response on Helpfulness of Topics

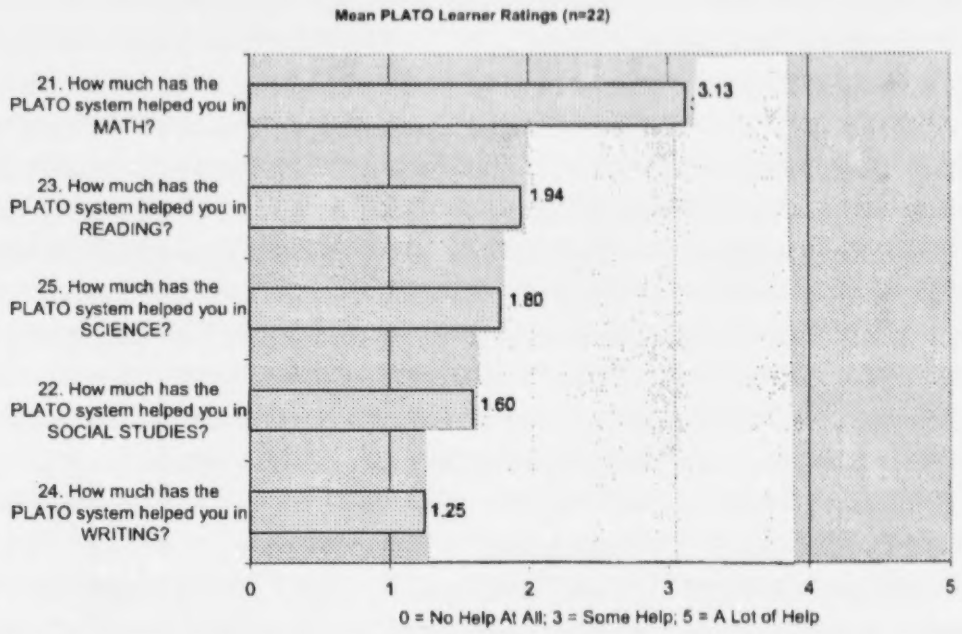
Mean PLATO Learner Ratings (n=22)
21. How much has the PLATO system helped you in MATH?
23. How much has the PLATO system helped you in READING?
25. How much has the PLATO system helped you in SCIENCE?
22. How much has the PLATO system helped you in SOCIAL STUDIES?
24. How much has the PLATO system helped you in WRITING?
3.13
1.94
1.80
1.60
1.25
0
1
2
3
4
5
0 = No Help At All; 3 = Some Help; 5 = A Lot of Help

Figure 24. Mean Student Rating on Helpfulness of Topics

BEST COPY AVAILABLE

PLATO Learner's Survey Comments.

The following text summarizes student answers to open-ended questions. The full text of comment is given in the Appendix.

1. *What do you like **best** about learning from the computer?*
In the nineteen responses, the most frequently mentioned positive issue involved the program's instructional style and content (8) and the flexibility in using the program (6). Students liked receiving patient instruction, in a step-by-step format, with clarity. They also liked working at their own speed and when they had time during the day. There were a few other comments—two about liking the print option, two about getting out of work, and one about privacy.

2. *What do you like **least** about learning from the computer?*
The 19 responses to these questions were varied and included six positive statements about the program generally.

Most corrective comments addressed instructional design and technological issues. Four students reported activities taking too long—activities were time-consuming and took too long to go to another lesson. Two other students did not like moving within activities—"going back and forth" or being returned to the tutorial. One said that activities are too difficult at the beginning.

Three comments had to do with boredom and routine; one student tired of listening to the computer talk and another was bored because there was no conversation. A few comments spoke touchingly of frustration and possible learning disabilities. One had eye strain (which may be hint at a need for glasses or at light sensitivity, which is common with learning disabilities). Three of them said they did not have support:

> "I hated working on a computer. I didn't understand crap about what we were doing."
> "No book and not much help from someone."
> "It can't help if you don't know exactly what it is you need help with."

3. *How would you change the computer lessons or the way you use them?*
There were 16 responses to this question, 12 of which suggested changes. Three students addressed speed (perhaps from frustration typical of struggling learners); they recommended faster paced activities, shorter activities, or faster access to activities. Three of them said they wanted better instruction about how to do activities or tests and a better way to verify that their answers are acceptable. Two wanted more stimulation—music or more interesting presentations. Two wanted easier activities, one of whom specified activities that start easy and progress from there. One student would like more access to computers and one would like to be able to approach the program with a better attitude.

4. *What other suggestions do you have to improve any part of the course(s) which use PLATO?* Most of the six added recommendations were repeated from former questions; the exception was "better graphics".

Discussion

Overall, educators and students alike are pleased with PLATO—both its technical and instructional qualities. They particularly like the individualization and flexibility, and students particularly like the clarity of instruction that it provides them. There are some suggestions for PLATO planners, however. While teachers reported that students can use the system easily, some students reported a few specific problems, such as not being able to get help from the system when they needed it. (This is particularly significant for students who did not have available instructors. Not being able to get help, however, may be the result of not providing adequate student training on the system, or in appropriate placement in an activity, rather than inherent software deficits.) In addition, there are hints of desires from teachers for more topic areas and greater depth of instruction (even though PLATO is described as the best) and from students for more interesting activities.

For Piedmont High School, PLATO student gains on the AHSGE are very positive, almost reaching the performance gains of non-PLATO students. The big story in this evaluation is that the low-scoring PLATO students almost caught up with high-scoring peers. The PLATO usage pattern at PHS is varied, but most usage corresponds to the supplementary model. The observed overall test score gains of ten to fifteen percent on AGSGE subscales are in the range expected for a supplementary model. Greatest usage was in Math, so the gains there are expected. With light usage in reading, however, the gains in AHSGE reading probably are due to the Language Arts use, rather than the reading use.

This PLATO success story must be framed by considering the low-performing nature of its students. Even though only 12% of PLATO learners had specified disabilities (a typical proportion), the fact that most of them have failed either a state exam subtest or a course indicates a great need for targeted, well crafted instruction that addresses basic skill deficits while maintaining high student interest. This supposition is supported by a high drop-out rate, something that is usually indicative of students who lack skills sufficient to do high school level work. Furthermore, verbal and written comments described students who do not, or cannot, plan and work effectively for success. Even though most students who answered the survey said that they did their best, educators spoke of students who tried to do math on PLATO without using scratch paper and who needed extra help with basic foundation concepts. PLATO, with its individualization, flexibility, and involvement has been motivating to many such students who have wanted to graduate, but these students have also needed clear requirements and guidance in order to make the program work best.

Mr. Akin is an instructional leader who has demonstrated that PLATO implementation can be accomplished by one motivated person. He has done an admirable job of enlisting

as many educationally needy students as possible into PLATO opportunities, working creatively with their schedules. This site study demonstrates that it is valuable for PLATO representatives and training to encourage principals by suggesting elements of a strong program and ways in which to successfully implement them.

Accounts of instructors spending one-on-one time with students to correct their underlying misunderstandings of concepts demonstrate the need for instructional support, at least occasionally, for low achieving students. It could also be implied from these accounts that FASTRACK may be a superior way to assess student needs, particularly in this situation where the pressure to meet state objectives dictated that learning time be spent in the most efficient way possible, with no extraneous instruction.

PLATO use data showed that PHS students typically mastered only one-third to one-half of all activities they attempted. This low mastery rate suggests the need for a more rigorous implementation of PLATO. Students should be expected to master modules before being able to go on to other instruction. Educators should be more closely and more frequently monitoring student progress and intervening to help them with problems.

It should be pointed out that lack of computer access at PHS is the consequence of both software choices and machine availability. The school's two computer labs are booked for other purposes—one is used for an old CAI program that "has proven itself" (and has old equipment that could not be used for PLATO anyway) and one for computer and word processing instruction. Most teachers do not see the value of using their one or two classroom machines for PLATO. The primary location for PLATO use is the conference room, which is located in Mr. Akin's geographical and instructional domain. However, the small amount of teacher PLATO use may be an issue of access as much as curriculum requirements, interest, or skill.

Another issue evidenced at PHS, as well as other PLATO sites, is how to assign grades for credit-completion PLATO work. In order to grade student work, educators are required to understand and reconcile their philosophy of grading with the instructional design of computer software. PHS instructors pointed out that students could test out of an activity (What grade could that earn?), and that mastery tests end after four correct responses (so they could not give credit for the untested items). Mr. Akin resolved the dilemma by giving C's for mastered work, based upon the 75% minimum score[5]. (He did not discuss other grading possibilities he may have considered.)

Printed PLATO student reports were not used generally for instructional decisions, except as they are used by Mr. Akin on occasion. He reported liking them very much. It is not clear if PHS needed to spend more time managing the PLATO data files and records, particularly as they go from year to year.

Finally, we suggest that PHS consider making more systematic use of existing tools to achieve better individualized placement through the use of the PLATO state alignment

[5] Module mastery tests have a passing score of 80%. Cumulative tests can be set by the instructor to have any passing score.--*ed*

information, use of CAT and PLATOLink tests, requiring mastery, use of Math Problem Solving, upgrade to new reading, upgrade to new Algebra, and by providing more teacher training. Improved teacher training and involvement in PLATO is a particularly important strategy to consider. Some updates in PLATO software have already been made by PHS to achieve greater alignment with the AHSGE. Also, the PLATO Science update has been installed at PHS. PLATO Reading has not been updated because of cost, according to Mr. Akin, and because the older version works best with the AHSGE, according to Mr. Hall (the PLATO AM).

Appendix: Teacher and Student Survey Open-ended Responses

Instructor's PLATO Evaluation for each of the five educators (a through e)

1. What do you like **best** about teaching with the PLATO computer?
   a. The ability to provide individualized instruction.
   b. It is self-paced. I can continue with more advanced students or slow down with slower students.
   c. The ability to individualize instruction.
   d. Variety of lessons.
   e. It gives students an opportunity to work at their own pace.

2. What do you like **least** about teaching with the PLATO computer?
   a. The assessments need to have more higher-order questions and they need to be more closely connected to the AHSGE [state graduation exam].
   b. It seems to service all of my needs.
   c. The test needs to be more consistent with the AL High School Graduation Exam.
   d. Not enough accessible computers for entire class.
   e. Each topic title is not fully explained like it should be.

3. Was there a regular time within the sequence of a lesson or unit in which your students experienced their PLATO modules?...
   a. Summer school, after school
   b. No.
   c. PLATO was used after school for remediation.
   d. .
   e. No.

4. Describe any strategies you employed to determine whether or not the PLATO modules assigned to each student were the most appropriate for ensuring their success in your class.
   a. We used objectives that were aligned to the AL High School Graduation Exam.
   b. They can complete additional assignments for each class without losing time in class.
   c. Students were assigned topics that were aligned to the portions of the AHSGE that they failed.
   d. .
   e. Used the program as a way to track the progress of the student.

5. How would you change the PLATO lessons?
   a. Assessment component needs to be more closely aligned to the AHSGE.
   b. I have only worked with PLATO for one year. At this time, I cannot suggest any changes.
   c. Lessons should be more in depth.
   d. .
   e. Each topic title is not fully explained like it should be.

6. What suggestions do you have to improve the way you use the PLATO system?
   a. .
   b. None.
   c. Students could be scheduled more regularly into the PLATO lab.
   d. .
   e. Continue to add different topics.

7. What other comments or suggestions do you have on the PLATO system or this course?
   a. .
   b. Include a wider variety of work as new developments are made.
   c. None.
   d.
   e. NA

PLATO Learner's Survey Comments (students 1 through 22)

Responses to the open-ended questions on the PLATO Learner's Survey are transcribed below. Each student survey was numbered for data entry and future reference, and those numbers have been used in this transcription for identification purposes. When a question was left blank on a survey its form number was skipped in the transcription. Spelling, capitalization and punctuation have been corrected when it seemed necessary for ease in reading.

1. What do you like **best** about learning from the computer?
   1. Working at my own speed.
   2. All the help it gives.
   3. Privacy.
   4. It lets me work when I want to.
   5. It gives you examples step by step about how to work the problem and then makes you work them step by step, showing you what you've done wrong.
   6. I think it is more effective in teaching than just listening to a teacher talk.
   7. No pressure.
   8. I understand it better than anything else.
   9. I can go at my own pace.
   10. It is easy to use and easy to learn.
   11. I like that it takes up a good bit of time.
   13. It shows you what you missed, and reworks the problem so you can understand it.
   14. Helped me on Exit Exam [AHSGE].
   15. You can go at your own pace.
   16. That you can print any important notes off the computer--that's what I like most.
   17. I didn't have to write the questions down.
   18. It got me out of work.
   21. That it has time to explain to you.
   22. It's faster.

2. What do you **least** about learning from the computer?
    1. I'd rather work at computers than go to class.
    3. Too time consuming.
    4. It gets old listening to the computer talk and all the go back and forth.
    5. Having to go back to the beginning of a topic if you miss so many questions.
    6. There really isn't anything I don't like about the computers.
    7. Boring.
    8. It is slow, and on the science it has too much to read when you don't read a lot on the exit.
    9. Takes a long time to do.
    10. None.
    11. That the levels start out too hard.
    12. It can't help if you don't know exactly what it is you need help with.
    13. Nothing much.
    14. Nothing.
    15. It gets boring because there is no conversation.
    16. That you can go at a steady pace—you won't have to rush.
    17. It takes too long to go to another lesson.
    18. I hated working on a computer. I didn't understand crap about what we were doing.
    21. If you look at it too long it hurts your eyes.
    22. No book and not much help from someone.

3. How would you change the computer lessons or the way you use them?
    1. I wouldn't.
    3. Faster paced activities.
    4. Where it lets you go back to your answers that you didn't feel confident about.
    5. I think that there's not a lot you can do to make them better.
    6. I would make them a little shorter.
    7. Music.
    8. I would use it in classes more.
    9. Have hints on tests, just to show you how to do them.
    10. Better ways to describe what to do on a lesson.
    11. I would change the toughness of it. I would start it out sort of easy and then work my way up to hard.
    13. I wouldn't change nothing.
    14. Wouldn't change
    15. Make them more interesting.
    16. I wouldn't. I would keep them the same, but make them a little bit easier.
    17. Make the lesson pop on the screen faster.
    18. I wouldn't hate computer lessons.

4. What other suggestions do you have to improve any part of the course(s) which use PLATO?

    None or nothing=8 responses

    6. Make the program actually talk to you.
    7. Listen to music.
    9. Better graphics.
    10. Math is my weakest subject. I sometimes need help in it.
    11. I think it needs to be a little bit quieter in the classroom, where someone is using PLATO.
    15. Maybe do it more often to learn more.
    16. All reasons are great. I can't think of any at this time.

About the Authors

Nancy W. Quinn is an evaluator and instructional designer. She received a masters in Instructional Technology from Brigham Young University in 1991. She recently completed studies of statewide beginning literacy programs in three Midwestern states. She has evaluated the use of technology as a research tool in a research library. She has also evaluated the use of technology by fourth, fifth, and sixth graders in four-year at-school and at-home program.

David W. Quinn is currently working as an independent evaluator specializing in evaluating technology use for learning and teaching. He received a doctorate in educational evaluation from Western Michigan University in 1978. He recently completed ten years at the North Central Regional Educational Laboratory as a Senior Program Associate where he managed the evaluation unit and evaluated technology use in many setting. He has evaluated technology use for the states of Indiana and Virginia, and for school districts in Chicago, Miami-Dade, and Los Angeles County. Before NCREL, Dr. Quinn had conducted numerous evaluation studies for clients in K-12, university, not-for-profit social services, and for-profit training companies. For ten years he was on the faculty in the Department of Instructional Science, Brigham Young University, where he taught graduate research methods courses. He is the author of journal articles and book chapters evaluating technology use in education.

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

NOTICE

Reproduction Basis

X	This document is covered by a signed "Reproduction Release (Blanket)" form (on file within the ERIC system), encompassing all or classes of documents from its source organization and, therefore, does not require a "Specific Document" Release form.
	This document is Federally-funded, or carries its own permission to reproduce, or is otherwise in the public domain and, therefore, may be reproduced by ERIC without a signed Reproduction Release form (either "Specific Document" or "Blanket").